

With the preceding

~~4~~

THIRD REPORT

FROM THE

SELECT COMMITTEE

UPON THE

Improvement of the PORT of LONDON.

Ordered to be printed 28th July 1800.

REPORT

COMMITTEE

OF THE CITY OF LONDON



PRINTED BY...

R E P O R T.

28th JULY 1800.

THE SELECT COMMITTEE appointed to consider of such further Measures as may be necessary for rendering more commodious, and for better regulating, the PORT of LONDON; and to report their Proceedings from Time to Time, together with their Opinion thereupon, to the House;

HAVE, in obedience to the Orders of the House, proceeded to enquire into the Matters referred to them; and report, That in conformity to the Principles stated by this Committee in their Reports of last Year, they have thought it expedient, in the first Instance, to attend to such Suggestions, for the better Accommodation of the Commerce of the Port of LONDON, as were likely, if approved, to be most speedily carried into practical Effect. Their first Attention, therefore, was directed to a Bill for the Construction of WET DOCKS AT WAPPING, which early in this Session was submitted to the Consideration of the House, and has since passed into a Law, with various Alterations and Additions, many of which were suggested by Your Committee, as tending to the more convenient Distribution and better Accommodation of the Trade and Navigation of the Port. The Objections which were supposed to prevent the free Use of the GREENLAND DOCKS, have been removed by the same Act; which also provides for the future Purchase of the LEGAL QUAYS: And by another Law of the present Session, a more effective System of POLICE,

Order of Proceedings
of the Committee

Public Local Stat. 40
Geo. III. c. 47.

Pub. Gen. Stat.
40 Geo. III. c. 87.

THIRD REPORT ON THE

POLICE, which had been long wanted for the Protection of the immense Mass of Floating Property upon the River THAMES, is now at length established.

Your Committee congratulate the House on the Security which will be provided for some of the most important Branches of our Trade, and the Facility of Navigation which will be obtained, whenever these Acts, and the Act passed in the last Session of Parliament for the Construction of the WEST INDIA DOCKS and the Regulation of the Port, shall be carried into complete Effect: They also congratulate the House upon the Progress made towards the Establishment and convenient Arrangement of a general Warehousing System: And it is with great Satisfaction they point out these vast and expensive Enterprizes, as undeniable Proofs of the Spirit, the Activity, and Wealth of the Nation.

§ 1.

STATE OF LONDON BRIDGE AND OF THE RIVER.

State of London
Bridge.

Your Committee, from a Variety of Circumstances stated in their Second Report of last Year, were led to consider the Condition of LONDON BRIDGE, as the next Object requiring their Attention; and they find, that notwithstanding a large Sum of Money has been Annually applied to the Repairs of this Bridge, that the Methods employed to secure it have, in several Instances, proved wholly ineffectual: That the Bed of the River suffers perpetual and increasing Injury from Shoals, occasioned partly by the Obstruction of the natural Course of the Tide, and partly from the Dispersion of the Materials employed for the Purpose of strengthening the Bridge: That for several Hours in each Day, the Navigation downwards is impracticable for small Boats, and hazardous even for large Craft, and all Navigation upwards totally prevented; and that if the Bridge should be rebuilt on such a Plan as to admit the Passage of large Vessels, the Space between London and Blackfriars Bridges, might afford essential Accommodation to that Part of the Trade which is carried on in Vessels whose Draft of Water does not exceed the Depth which that Part of the River is capable of permanently affording. For the Detail of these Particulars, they beg leave to refer to the Report above-mentioned, and the Appendix annexed to it; and, strongly impressed with these Considerations, Your Committee proceeded to collect such further Information as they could procure respecting the State of London Bridge.

Second Rep. of last
Session, and (Ap. B. 1.
to 11.)

I. On

1. On this Head of Inquiry, Your Committee first thought proper to require of Mr. Mylne to lay before them an Account of such Observations as he had made, during the Time that he was employed in the Construction of Blackfriars Bridge, with respect to the Security of London Bridge, and its Effect on the Bed of the River. They have annexed in the Appendix to this Report, Mr. Mylne's Answers to the Questions proposed to him by Your Committee; which contain a very elaborate and important Investigation, illustrated by several Designs respecting the Construction of London Bridge, and the State of the Bed of the River in general, and particularly of the Effects produced on it by the Bridge. It appears from these Observations, that the Structure of the Bridge is so defective in its original Design, that no Art or Expense which has been or can be bestowed on it, can secure it from the Risk of a sudden and total Destruction, under certain Circumstances of the River; and that in ordinary Circumstances, it receives continual Injury from the Rapidity of the Current, occasioned by the Narrowness of the Arches, and requires frequent Support from the Addition of new Materials; all of which are in no long Time washed away, and add to the Shoals which the Bridge has already been the Means of forming.

Appendix (A. 1.)

Appendix.
Plate I. (a.) (b.) (c.)
(d.)

2. For the same Purpose, Your Committee thought it necessary to direct the Bed of the River to be bored to the Depth of Twelve Feet below Low Water Mark, in a Variety of Situations between London and Blackfriars Bridges, in order to ascertain the Soil of which it is composed; and from this Examination, as well as from previous Information, Your Committee have Reason to believe, that a Depth of Water of from Twelve to Fifteen Feet at Low Water might be obtained and preserved there without Difficulty, and at no great Expense, when the existing Shoals are removed.

Bed of the River.

Appendix (A. 2.)
See Report of last Section (Ap. A. 1. to 6.)

3. Your Committee have also called for a Statement of the Height of the Masts, and the Draft of Water of Vessels likely to frequent that Part of the Port of London, if it should be made accessible to them; and this Statement they have inserted in their Appendix: From which it appears, that Vessels not exceeding 200 Tons Burthen, might be sufficiently accommodated by such a Depth of Water as would then be obtained, and that such Vessels would in general be able to pass at all Times with their Top Masts struck, under an Arch of 65 Feet Height above the High Water Mark at medium Spring Tides: And, in order to shew the Number

Height of Masts.

Appendix
(A. 3. & 4.)

Appendix
(A. 5, 6, 7, & 8.)

ber of Vessels which might be expected to avail themselves of this Passage, Your Committee have called for Accounts of the Foreign and Coasting Trade of the Port of London for the Year 1799; which they have inserted in their Appendix, together with an Account of the Shipping employed in the Foreign Trade, and frequenting the Out Ports in the same Year.

By these Accounts it appears, that the Number of Vessels employed in Foreign Trade (exclusive of Ships from the East Indies, and of such Ships as are directed by Act of Parliament to deliver their Cargoes in the Docks now constructing in the Isle of Dogs and in Wapping) which entered the Port of London in the Year 1799, was 2,368, and their Tonnage 413,454, making an Average Burden of 174 Tons; that of the Colliers in the same Year 3,898, and their Tonnage 892,362, making an Average of 228 Tons; and that of Coasters below the Burden of 200 Tons, 7,248, and their Tonnage 519,516.

§ 2.

OF REBUILDING THE BRIDGE.

Bridge to be rebuilt.

Your Committee, being convinced from these Inquiries, as well as from the Information collected by them last Year, that the rebuilding of London Bridge, upon improved Principles, would be a Measure of substantial Economy in itself, as well as subservient to other Purposes of still greater Importance, thought it necessary, in the next Place, to call for the Opinions of several eminent Artists, with regard to the Manner in which it could be executed with the greatest Advantage, in respect of the Accommodation of Trade, and of Economy in Construction, not omitting the subordinate though important Objects of Magnificence and Ornament to the Metropolis.

1. For these Reasons, Your Committee determined to direct the Attention of those Artists, who might be inclined to submit any Plan for the Improvement of this Part of the Port, to the following Points:—

Objects to be attended to in rebuilding the Bridge.

First: To the free Passage of Vessels not exceeding the Burthen of 200 Tons. Secondly: To the easy and uninterrupted Communication of Carriages and Passengers from Shore to Shore, with as little Acclivity as possible. Thirdly: To the most convenient Access and Communication to the great Avenues of the Town. Fourthly: To the Attainment of these Objects with the

the least possible Interference with private Rights and Property. Fifthly: To the Embellishment and Ornament of the Town. Sixthly: To the Expense and Length of Time required for the Execution.

2. The different Artists, who have communicated their Ideas to Your Committee, propose to attain these Objects in Three different Ways:

Different Modes proposed.

1st. By a Bridge, of which the Centre Arch shall be at least 65 Feet high in the Clear above ordinary Spring Tides, and which shall communicate, by Means of a descending Causeway, in a direct Line with some principal Street on each Side of the River. 2dly. By Means of a similar Bridge communicating with the Streets by lateral Approaches, nearly at right Angles with the Bridge and parallel to the Shores, to be raised on Arches founded on a new Embankment in front of the existing Wharfs and Buildings. 3dly. By Two parallel Bridges, inclosing between them a Space sufficient for the Reception of such a Number of Vessels as are likely to pass in One Tide, and admitting the Passage of Ships by corresponding and opposite Drawbridges in each Bridge, one of which Drawbridges shall always be lowered for the Use of Passengers, when the other is raised for the Admission of Shipping.

§ 3.

PLANS PROPOSED.

1. On the First of these Principles, Your Committee have received Designs from Mr. Dodd, Messrs. Telford and Douglass, Mr. Samuel Wyatt, and Mr. Wilson; and some Observations, giving general Ideas of a Plan, from Mr. Mylne.

Mr. DODD has given Two Designs; the First of which shews a Bridge proposed to be built on the Foundations of the existing Bridge, but with One very wide Arch in the Centre, framed of Iron, and supporting an Entablature and Ballustrade of Stone; but Mr. Dodd being convinced, by subsequent Inspection, of the insecurity of the present Foundations, now exhibits this Design only as a Specimen of the Appearance of Arches so constructed. The Second is a Design of a Stone Bridge highly decorated, proposed to be placed about 40 Yards above the present Bridge, close to the East Side of Fishmonger's Hall on the North, and near

Mr. Dodd's Plans.

Appendix.
Plate II.

Appendix.
Plate III.

THIRD REPORT ON THE

near Pepper Alley on the South Shore. The Ascent of this Bridge is Two Inches and Three-fifths of an Inch in a Yard.

Mr. Samuel Wyatt's
Plan.

Mr. SAMUEL WYATT's is a Design of a Bridge intirely constructed of Cast Iron, except that he proposes to build Piers of Granite, and to fill up the Bulk of the Superstructure with Chalk, in order to prevent any Concussion from the Passage of Carriages. This Design was further illustrated by a very elegant painted Model, but not accompanied by any Plan or Estimates, which Mr. Wyatt had not Time to prepare.

Mr. Mylne's Plan.
Appendix (B. 2.)

Mr. MYLNE proposes the new Bridge to be directed to the Monument, round which a magnificent Square should be built; and from thence that a wide Street should be extended into Gracechurch Street, and completely through the Town; and that on the Surrey Side it should communicate with a new Road into Kent.

Plans of Messrs. Telford and Douglass.
Appendix (B. 3.)
Appendix.
Plates IX. X. XI.

Messrs. TELFORD and DOUGLASS have laid before Your Committee no less than Three different Designs on this Principle, exclusive of One which will come under Consideration hereafter, as contrived on the Second of the Principles they have described. Of their Three former Designs, Your Committee have only thought it necessary to insert One in their Appendix, agreeing with the Architects themselves, that a decided Preference was due to that which they afterwards produced. All these Plans agree in proposing an Iron Bridge; and their First Design places it in the Situation of the present Bridge, the principal Arch near the Shore on the Northern Side, with a View of increasing the Length, and diminishing the Steepness of the Ascent from the Southern or Surrey Side of the River. It may be observed, that though the Acclivity of the Bridge would be considerably eased by this Expedient, it would not only give it a very disagreeable and unsymmetrical Appearance, but would be less convenient for Navigation, in case the Current of the River, upon being cleared from its Obstructions, should form the deepest Channel nearly in the Middle, which it seems reasonable to expect will be the Case. In the subsequent Designs, Messrs. Telford and Douglass place their principal Arch in the Centre of the Bridge, without proposing any other material Alteration. These Designs are accompanied by very detailed Estimates, which deserve the more Attention, as Mr. Telford has been already employed in many Public Works
of

Appendix (B. 3.)

of this Nature, and particularly in the Construction of a considerable Bridge of Iron at Buildwas, in Shropshire.

Mr. WILSON, the Architect of the celebrated Bridge at Wearmouth near Sunderland, has laid before Your Committee a Design for an Iron Bridge of Three Arches; to which he has annexed an Estimate of the Iron Work only of the Bridge, and a Description of its Construction, which Your Committee have inserted in their Appendix: The Curve of this Bridge is remarkably easy, having an Ascent of only One Inch and a Half in a Yard; but it would therefore require a proportionably greater Length of Causeway on the Shores.

Mr. Wilson's Plan.
Appendix.
Plate VIII.

Appendix (C.)

2. Only One Design on the Second Principle has been submitted to Your Committee, that of Messrs. TELFORD and DOUGLASS, but it is evident, that any of the preceding Plans might be easily accommodated to this Principle, by the Addition of lateral Causeways, gradually descending on the Wharfs at each End of the Bridge.

Plate XII.

This Design of Messrs. Telford and Douglass, is for an Iron Bridge of Five Arches, having an Ascent of Two Inches and a Quarter to a Yard, and connected with the Shore on each Side by a descending Causeway, formed upon Wharfs to be gained out of the River by Embankments, and curved in such a Manner as to make the Turn as easy as possible. The Causeways they also propose to support on Iron Arches, under which Warehouses may be constructed, and on the East Side to terminate with the Streets leading to the present Bridge. This Plan, like the others submitted by those Gentlemen, is accompanied by a detailed Estimate inserted in the Appendix, to which Mr. Douglass has added a Plan for forming a Deposit and Public Market for Coals in the Warehouses to be constructed upon the new Embankment, into which they may be immediately unladen from the Ships lying along the Quays.

Plan of Messrs. Telford and Douglass.
Appendix.
Plates X. XI. & XII.

Appendix (B. 3.)
& Plate IX.

3. Your Committee have only One Design to offer to the Consideration of the House, of a Bridge constructed on the Third Principle; namely, that of Mr. DANCE, the Architect of the City of London. Mr. Dance proposes to erect Two low parallel Bridges, at One Hundred Yards Distance from each other, the one above, the other below, the present Bridge, opening at each

Mr. Dance's Plan.
Appendix (D.)

Appendix
Plates XIII. to XIX.

End into a grand Area of a Semi-elliptical Form; that on the London Side extending beyond and surrounding the Monument. The Passage for Shipping to be contrived by Means of opposite Drawbridges in each Bridge, of which one should always be open, and the other closed. The Drawbridge which was open, to be distinguished by a Signal, such as a Flag in the Day Time, and strongly reflecting Lamps at Night. Mooring Chains, and other Accommodations for Shipping, to be placed in the Space between the Bridges; and the Vessels lying there to be so arranged as to leave a free Passage for Boats and Craft.

§ 4.

COMPARATIVE MERITS OF THE PLANS.

Your Committee having given this summary Account of the different Plans, think it necessary to submit to the Judgment of the House a few Observations on their respective Merits, considered with Reference to those Points to which they have directed the Attention of the Artists.

Observations on the Plans.
1. Freedom of Navigation.

1. With respect to the First Point, namely, the Freedom of Navigation, it will be evident, from the Inspection of the Designs, that all Plans contrived on the First and Second of the Principles which they also have described, will provide completely for a free and uninterrupted Passage, at all Times of the Tide, of Vessels of the proposed Tonnage, on the easy Condition of striking their Top Masts; and that all Vessels whose Masts, when completely rigged, are less than 80 Feet high, may pass for some Time, before and after Low Water, without any Reduction of them at all: That in Plans founded on the Third Principle, the Height of Masts is wholly indifferent, but that every Vessel must be detained in the Area between the Bridges at least One Tide in her Passage both up and down; that the Arrangement of Vessels in the Space included between the Bridges, where they will lie in a strong Tide, will be difficult, and sometimes not free from Danger; and that whenever their Number is considerable, it will require much Skill and Contrivance to provide for the free Passage of the Craft and Boats employed on the River, as well as to regulate the successive Passage of the Shipping, without further Interruption and Delay.

2. Connection between the Shores.

2. On the Second Point, of Connection between the Shores; it appears, that all Plans upon the First Principle must be attended with

with a very considerable Acclivity; but that if the Height of the principal Arch does not exceed 70 Feet, it need not be steeper, though of greater Length, than that of Blackfriars Bridge, which has not been found materially inconvenient for loaded Carriages: That in those upon the Second Principle, the Ascent may be eased by increasing the Length of the oblique lateral Causeways; but that the Length of Passage from Shore to Shore is increased by this circuitous Approach, and the Turns on the Ascent, though eased by its Curvature, may be found productive of Inconvenience at all Times, and frequently occasion Accidents, in the Darkness of the Night, and in foggy Weather. The Plans upon the Third Principle, provide for the Communication in the most convenient Manner on a perfect Level.

3. On the Third Point, of Access from all Situations: The Plans first described have the material Inconvenience of being inaccessible from the low Streets near the Level of the River, without a considerable Circuit: Those contrived on the Second Principle, have the same Disadvantage in a smaller Degree; and those of the Third, may be considered as wholly exempt from it; the Observation in each Case being applied only to the general Principle, and independent of the particular Advantages or Defects of each Plan, arising from the Situation recommended by the Architect.

3. Access from all Situations.

4. With respect to the Fourth Point, Interference with Property, it may be observed; that this Interference, in all the Plans, arises in a great Degree from proposed Improvements in the Streets, and Communications, which are not necessarily connected with the Rebuilding of the Bridge, and which would be equally applicable to several different Designs: That by Bridges upon the first Principle, a considerable Number of Buildings will become so incommodious from the Construction of the Causeways descending from the Level of the Bridge, that they must be rebuilt or greatly altered: That those on the Second Principle do not necessarily interfere with existing Buildings, except to a small Extent, as the Ascent and Descent are gained from the Bed of the River by Means of Embankment; and that those on the Third, would necessarily require the Sacrifice of a great Number of Buildings, to form a commodious Access to each End of the Double Bridge.

4. Interference with Property.

5. On

g. Magnificence.

Plates XIII. to XIX.

5. On the Fifth Point, Magnificence, it may be observed; that Bridges with standing Arches, and a considerable Elevation, are evidently more ornamental and magnificent in themselves than level Drawbridges, which are however capable of being so combined with other Improvements, as to exhibit the Town from the Banks of the River to the greatest Advantage, and to afford a very grand Entrance to it. This may be seen in Mr. Dance's Designs; but as similar Improvements of this Nature may be combined with other Plans, its exclusive Advantage appears to be that of ascending instead of descending into the Town, and therefore exhibiting the Buildings in a more advantageous Point of View. The Bridges of the Second Class, with lateral Ascents, have the particular Advantage of being very finely shewn in the oblique Approach to them. Your Committee think it unnecessary to enter into any Discussion of the architectural Merit of the several Designs, which they submit to the Judgment of the House.

6. With regard to the last Circumstance to be considered, that of the Expense of Execution, much will depend on the Decision between a Stone and an Iron Bridge: Waving for the present the Consideration of this Point, it is clear, that the Expense of the double Bridge upon the Drawbridge Plan, together with the large Area required at each of its Extremities, must greatly exceed that of the single Bridges, proposed in either of the other Systems; but this Excess is in some Degree balanced by the Expense of their descending Causeways, whether direct or curved. Upon this Subject the Estimates of the different Artists vary considerably; but it appears upon the Whole, that the Execution of the Drawbridge Plans would be slower and more expensive than either of the others; and that of the standing Arches, with oblique lateral Approaches, in some Degree the most speedy and æconomical, although their descending Causeways occupy a very considerable Extent of Embankment on the River, which in the other Cases might be employed to great Advantage in Wharfs and Warehouses, and which would be more valuable than the Warehouses formed in these Causeways.

Materials of the new Bridge.

7. Though the Materials of the new Bridge are not necessarily connected with any Class of Plans, yet they form an essential Part of the Designs of each of the Artists, and an important Subject

Subject for Consideration. By some Architects a Stone Bridge is recommended, and by others Iron Bridges of different Constructions. In favour of a Stone Bridge it is contended, that a Work of such Importance ought to be constructed of the most solid and durable Materials, and that it is safer to depend on a Structure which, though more expensive in its Erection, is calculated to last for Ages without any considerable Decay, than to trust to the Success of an Experiment which has not yet been tried on any great Scale for a sufficient Length of Time. On the other Hand it is asserted, that an Iron Bridge is more peculiarly adapted to a Work of this Kind, as it obstructs the Waterway and impedes the Navigation much less than any other, and is alone capable of admitting of Arches to an Extent sufficient for the Passage of large Ships; that with respect to its Stability, no good Reason can be given for entertaining Doubts; that the Experiments hitherto tried have been uniformly successful and satisfactory; that the Difference in Point of Expence is so great (especially in some of the Designs) that in Point of Economy it would deserve the Preference, even if its Durability were ascertained to be much inferior to that of a Stone Bridge; and that any accidental Injury or partial Decay must, from the Structure of the Bridge, be immediately discovered and very easily repaired.

8. As to the Situation of the Bridge, Your Committee are of Opinion, that it will be expedient to have it placed to the West above Old Swan Stairs, and connected on the Surrey Side with St. Margaret's Hill, by a new Street passing to the West of St. Saviour's Church, and running in a straight Line into the High Street of the Borough. This Situation unites several Advantages: The River is considerably narrower in that Part than in any other; the Buildings to be pulled down on the London Side are of much less Value than those near the present Bridge, and those on the Surrey Side are extremely mean and ruinous; and as the Bridge would form nearly a straight Line between the High Street of the Borough and the Royal Exchange, it would be the Means of opening a most convenient as well as magnificent Entrance into the Centre of the City: And by the Addition of lateral Ascents, such as are proposed in the Second of the Modes of rebuilding the Bridge above described, the present Communication between Fish Street Hill and the Borough, may be preserved without Interruption, and with very little Deviation. It

Situation of the new Bridge.

may further be observed, that it would be extremely difficult and expensive to form a solid Foundation upon or very near the Situation of the present Bridge.

9. Your Committee think it due, in Justice to the Talents of the several Architects, as well as most consistent with the Deference they owe to the House, to submit to its Judgment all the Plans they have received, excepting the earlier Designs of Messrs. Telford and Douglass, especially as they will all be found to have considerable Merit in various Ways: Nevertheless Your Committee so far give the Preference to a Bridge on such a Construction as is proposed by Mr. Wilson, in the Situation above described, combined with the lateral Approaches suggested by Messrs. Telford and Douglass, and various Improvements of the Streets and Quays designed by Mr. Dance, as best uniting the several Advantages of Convenience, Ornament, and Economy, that they have directed such Plans, Sections, and Valuations to be made, as may facilitate the Execution of these Designs, if they should meet with the Approbation, and receive the Sanction of Parliament. And a general Idea of the proposed Improvements, may be formed from the Plan drawn by Messrs. Telford and Douglass. And Your Committee have inserted in their Appendix a Copy of a Design of Sir Christopher Wren for re-building the City of London after the great Fire in 1666, taken by Permission of the Warden of All Souls College in Oxford, from an original Drawing of that great Architect; by which it will appear that his Ideas for the Improvement of the Banks of the River were in many Respects similar to these now proposed.

Plate VIII.

Plate XII.

Further Directions
given by the Com-
mittee.

Plate IX.

Plate XXI.

§ 5.

GENERAL OBSERVATIONS ON ALL THE PLANS.

General Observations.

Your Committee will next proceed to the Consideration of some Circumstances, equally applicable to all the various Plans laid before them.

London Bridge Water
Works.

1. The First of these is the Stoppage of LONDON BRIDGE WATER WORKS, which must necessarily take place whenever the Current of the River is suffered to flow in a placid and equable Course; the Wheels of the Machinery being turned at present by the violent Rush of the Water through the narrow and obstructed Arches of the Bridge. Your Committee have called for an Account of the Receipts and Expenditure of those Water Works for Twenty Years past, with a View of ascertaining their Value to the Proprietors,

Appendix
(F. 1. & 2.)

prietors, and the Extent of Compensation which might be equitable, in case it should be thought expedient wholly to remove them. It may, however, be observed, that these Works afford a material Accommodation to the neighbouring Parts of the Town, and that if they should be continued in their present Situation, a very moderate Compensation would satisfy the Proprietors for any Injury they might sustain from the Removal of the Bridge, as the Addition of another Steam Engine to one which they have at present, would be more than sufficient to put into Action the Machinery now moved by the Water Wheels.

2. A Second Point for Consideration, and of much greater Importance, is the EMBANKMENT AND IMPROVEMENT OF THE SHORES. Referring to the several Plans in the Appendix for the particular Proposal of each of the Architects already named, and also to a very curious Paper drawn up by Mr. Jessop on this Subject, accompanied by a Section of the River, shewing its present Width, Depth, and Form, and proposed Improvement, Your Committee beg leave to observe in general, that a considerable Embankment on the Northern Shore would not only be useful in deepening the Channel of the River, but might prove the Means of defraying a great Part of the Expense of the whole of this System of Improvements, as the Value of the Space gained from the River, either to be employed as Wharfs or Warehouses, would greatly exceed the Cost of the Embankment. And it might be desirable to remove so much of the Shore on the Surrey Side, where the Ground is of much less Value, as to straiten the Course of the River, and allow for a large Embankment on the London Side, without reducing the Breadth of the River in any Part below the Width which it now has opposite to Old Swan Stairs. And it is obvious, that the Gravel and Soil removed in ballasting away the Shoals in the River, may be advantageously employed in filling up the Embankments on the Shore, and forming Foundations for Warehouses.

3. This Part of the general System of Improvement, would be greatly facilitated by the Purchase of the LEGAL QUAYS by Government, a Measure authorized by the Act passed in this Session of Parliament for the Establishment of the London Dock Company, and of which Your Committee recommend the immediate Adoption. Your Committee have placed in their Appendix a Design and Plan for their Improvement, proposed by Mr. Dance; and other Designs for the same Purpose, will be found in their Appendix to their Second Report of last Session. If the Situation of the new Bridge should be chosen higher than that of the present, which,

for

Embankments and Improvements of the Shores.

Vide Appendix.

Appendix (G.) and Plate XX.

Legal Quays to be purchased.

Public Local Stat. 40 Geo. III. c. 47.

Plate XVIII.

See also Second Report 1799. Appendix (G 7. 8. 9. 10. 11. 14. 15. 16. & 17.)

for the Reasons before mentioned, Your Committee decidedly think it ought to be, a very valuable Addition of Space would be gained for the Extension of the Quays: And a further Accommodation might be very conveniently obtained, by taking in the Ground between the Tower and the proposed Entrance to the new Docks at Hermitage Dock. Without entering into any particular Detail respecting the most advantageous Plans for Wharfs and Warehouses, Your Committee refer to the Designs of Mr. Dodd and Mr. Dance, placed in the Appendix, as apparently very ingenious and convenient in their Construction.

Plates II. to VII.
& XIII. to XIX.

§ 6.

MEANS AND METHOD OF EXECUTING THE WORKS.

Modes of executing
the Plan.

In the last Place, Your Committee have to submit to the Consideration of the House, some Observations respecting the Execution of such Plans as may ultimately meet with Approbation, and the Means of raising such Funds as may be sufficient for this Purpose. If the Corporation of the City of London, who are by their Charter Conservators of the River, and who possess Estates charged with the Repairs and Maintenance of London Bridge, should be willing to undertake these Works, they might be authorized to lease out the Ground to be gained from the River by Embankments to the Owners of the next adjoining Premises, or in case of their Refusal to take it on reasonable Terms, they might be directed to dispose of the Lease by public Auction, and thereby form a Fund for defraying, first the Expense of the Embankments, and afterwards that of their other Improvements. The Extent of such a Fund would be very large, if the Estimates of Messrs. Telford and Douglass are correct, who compute the Value of the Wharfs, beyond the Expense of forming them, at £.945,918. Whatever Variations may take place in the Plan, it seems at least reasonable to estimate them at a Sum sufficient to cover the Charge of all the Improvements, except the Bridge. The same Resources might be applied, if the Execution of these Plans should be entrusted to a Commission acting under the Authority and Directions of Parliament; or if they should be carried on by a joint Stock Company: And the Improvement of the Streets, after opening the most necessary Communications, might be gradually and successively carried on in proportion as the Funds proved productive. In case the Mode of a Parliamentary Commission should be preferred, it may perhaps be adviseable to authorize the Issue of a Loan in Exchequer Bills, to such an Amount as the Wisdom of Parliament may approve, to be repaid out of such Funds

Appendix (B. 3.)

Funds as might arise from the Execution of the Measures pointed out. And Your Committee have inserted in their Appendix, the several Reports of the Committee of Common Council, intrusted with the Superintendence of the Construction of Blackfriars Bridge, in order to give an Example of the Manner in which Works of a similar Nature have formerly been carried on.

Appendix,
(E. 1. & 2.)

2. The Expense of building the Bridge is very variously estimated by the several Architects, according to the Materials and Construction which they recommend:

Expense of executing
the Plans.

Mr. Dodd's Estimate amounts, including the Expense of Causeways and Buildings to be taken down, to - £. 350,000.

Appendix (B. 1.)

Messrs. Telford and Douglass's First Design, including Purchases, Embankments, and Excavation of the River £. 988,154.

Appendix (B. 3.)

Their Second Design - - - - £. 1,041,654.

Their Third Design - - - - £. 1,054,804.

Mr. Wilson's Estimate for the Iron Work only of his Bridge - - - - £. 55,000.

Appendix (B. 4.)

Mr. Dance for his Double Bridge, with a grand Area at each End - - - - £. 1,279,714.

Appendix (D.)

For the same, with a contracted Area, as small as is consistent with Convenience - - - - £. 807,537.

Mr. Mylne and Mr. Samuel Wyatt have given no Estimates.

3. For the Execution of whatever Design may be preferred, the following Funds appear to Your Committee to be applicable:

Funds applicable to
the Execution.

First: A Sum to be charged on the Bridge House Estates, equivalent to the present Annual Expense of the Repairs of London Bridge: These are stated, in the Second Report of Your Committee last Year, to amount to upwards of £. 4,200. which, at Twenty-five Years Purchase, would raise - £. 105,000.

See 2d Report 1799,
Appendix (F. 1, 2,
& 3.)

Secondly: A Toll on Carriages and Passengers going over London Bridge, which, supposing its Produce only equal to that of the Toll on Blackfriars Bridge, would yield £. 7,000. a Year, and would therefore discharge the Principal and Interest of a Debt of £. 100,000. in about 20 Years - - - £. 100,000.

See 2d Report 1799,
Appendix (B. 11.)

Thirdly: The Orphans Fund, of which Your Committee have inserted an Account in their Appendix, and which, producing at present an Annual Surplus of about £. 14,000. may be supposed capable of bearing an additional Debt of - £. 100,000.

Appendix (F. 4.)

E

Supposing

Supposing Mr. Wilson's Plan to be adopted, and that the Expence of the Stone Piers, and the Causeways belonging to it, would be equal to Messrs. Telford and Douglass's Estimate for similar Works in nearly the same Situation, in their last Plan, the whole Expence would not exceed £. 200,000. and would, together with the Compensation of the Water Works, be sufficiently provided for by the foregoing Sum. But if one of the more expensive Plans is preferred, it will be necessary to apply a large Sum out of the surplus Value of the new Wharfs, or to raise it by some other Means.

Order of Proceeding
in the Execution.

4. All the Architects propose that the present Bridge should be left standing, for the Purpose of temporary Accommodation, during the Erection of the new Bridge; and this affords an additional Reason for the proposed Change of Situation to some Distance, as great Inconveniencies must take place from the Demolition of Buildings, or the Construction of lofty Causeways immediately contiguous to so crowded a Passage. It would however be desirable, as soon as the Means of moving the Water Works were provided, to open all the Arches now closed up, and to give the Stream as free a Passage as the Piers will admit.

5. With respect to the Order in which the several Works should be carried into Execution, Your Committee think it advisable to proceed as early as possible with the Embankment and Improvement of the Bed of the River between the Bridges; while these were going on, the Materials for the new Bridge might be collected, the Foundations laid for the Piers, and the most important Communications on both Sides of the River opened: No Alteration should take place below London Bridge, except the Purchase of the Legal Quays and other Premises, till the new Bridge is opened, in order to avoid the Inconveniencies which would arise from the Interruption of the Business at the present Legal Quays, before new Receptacles are ready for the Deposit of Goods.

Your Committee being ordered to report their Opinion on the several Matters referred to them, have come to the following

RESOLUTIONS:

1. THAT it is the Opinion of this Committee, That it is essential to the Improvement and Accommodation of the Port of London, that London Bridge should be rebuilt on such a Construction,

Construction, as to permit a free Passage, at all Times of the Tide, for Ships of such a Tonnage at least as the Depth of the River would admit at present between London Bridge and Blackfriars Bridge.

2. THAT it is the Opinion of this Committee, That an Iron Bridge, having its Centre Arch not less than 65 Feet high in the Clear above High Water Mark, will answer the intended Purposes, with the greatest Convenience and at the least Expence.

3. THAT it is the Opinion of this Committee, That the most convenient Situation for the new Bridge, will be immediately above St. Saviour's Church in Southwark, and upon a Line leading from thence to the Royal Exchange.

4. THAT it is the Opinion of this Committee, That the Shoals between the Tower and Blackfriars Bridge ought to be removed.

5. THAT it is the Opinion of this Committee, That the River ought to be embanked on a regular Plan from the Tower to Blackfriars Bridge, and Wharfs with Warehouses formed on the Embankments.

6. THAT it is the Opinion of this Committee, That the Notices required by the Standing Orders of the House, preparatory to the Execution of such a Plan as may finally be approved of, ought to be given previous to the next Session of Parliament, in order that the Work, if sanctioned by Parliament, may proceed without Delay.

PORT OF LONDON

A P P E N D I X

TO THE

Third Report from the COMMITTEE on the Improvement
of the PORT of LONDON.

28th JULY 1800.

CONTENTS OF THE APPENDIX.

Appendix.		Page.
(A. 1.)	REPORT from Mr. MYLNE, on the State of the River Thames, its Stream, and its Bed; on the Structure of London Bridge, and as to the Navigation of the River above and below it, &c. &c. With an Appendix, and Drawings - - - - -	25 & Plate I. Drawings, (a. b. c. d.)
(A. 2.)	Borings of the River betwixt London and Blackfriars Bridges; by Mr. John Foulds and Assistants - - - - -	39
(A. 3.)	Account of the Average Draught of Water of Ships, &c. when Loaded and in Ballast, and the Heights of their Masts above the Water when in Ballast Trim.—From the Principal Ship Builders in the River -	40
(A. 4.)	Average Draught of Water of Loaded Merchant Vessels, in Proportion to their Tonnage, &c.—From the TRINITY HOUSE - - - - -	42
(A. 5.)	Account of the Total Number of Ships, with their Tonnage, that entered Inwards and cleared Outwards at the Port of London, to and from Foreign Parts, in the Year 1799.—From the CUSTOM HOUSE - - - - -	43
(A. 6.)	Account of the Total Number of Ships, with their Tonnage, including their repeated Voyages, that have entered Inwards at the Port of London from Foreign Parts, in the Year 1799.—From the Same -	44
(A. 7.)	Account of the Total Number and Tonnage of Ships in the Coasting Trade, which entered Inwards and cleared Outwards at the Port of London in the Year 1799; &c.—From the Same - - - - -	46
(A. 8.)	Account of the Tonnage of Shipping Inwards and Outwards, frequenting all the Out Ports, for the Year 1799.—From the Same -	46
(B. 1.)	Mr. DODD's Account of London Bridge, with his Plans for a New One, with Wharfs, Warehouses, &c. - - - - -	47 & Plates II. to VII.
(B. 2.)	Mr. MYLNE's Plan of a New Bridge adapted to the Situation and Circumstances of London Bridge, the present State of the Navigation of the River Thames; &c. - - - - -	51
(B. 3.)	Estimates and Observations by Messrs. TELFORD and DOUGLASS, with a Proposal for a Deposite and Public Market for Coals - - -	57 & Plates IX. to XII.
	Specification	

Appendix.		Page.
(C.)	Specification of a Cast Iron Bridge over the Thames, by Mr. WILSON }	76 & Plate VIII.
(D.)	Mr. DANCE's Estimate for erecting a New Bridge, with Wharfs, } Warehouses, &c. - - - - - }	77 & Plates XIII. to XIX.
(E. 1.)	Report to Common Council on BLACKFRIARS BRIDGE, Embankment, and Surrey Roads, 1784 - - - - -	82
(E. 2.)	Final Report to Common Council, on building and completing BLACK- FRIARS BRIDGE, &c. 1786 - - - - -	118
(F. 1.)	Abstract of the Gross and Net Receipts of LONDON BRIDGE WATER WORKS, for the last Nineteen Years - - - - -	127
(F. 2.)	Expenditure of the Same - - for the same Period - - - - -	130
(F. 3.)	Account of the Net Income of the BRIDGE HOUSE ESTATES for Five Years, ending at Christmas 1799 - - - - -	134
(F. 4.)	Statement of the ORPHANS FUND - - - - -	136
(G.)	Report on the Effect of Deepening and Embanking the River Thames; } addressed by Mr. JESSOP to Mr. DANCE - - - - - }	138 & Plate XX.

PLANS AND DRAWINGS.

(These, from their Size, are necessarily done up separately.)

Appendix to Mr. MYLNE's Report, viz.

(a.) Section of the Locks, and Construction of the Piers of London Bridge -	
(b.) Soundings in May 1767, along the Middle Line of the River -	
(c.) Profile down the Middle of the River Thames through the Great Arch, 1767	
(d.) { Measurements across the River, Proportions of Piers, &c. to the Arches;—and { Soundings at London Bridge, 1767 -	} Plate I.

Mr. DODD's Designs, viz.

N ^o 1. } Plan for a Bridge to be erected on the Foundations of the present Bridge; II. } having its Center Arch, of Iron, 300 Feet Span -	} Plate II.
III. } Design for a Stone Bridge of Five Arches, with Views of the proposed IV. } Embankments, and Fire-Proof Warehouses above them -	} Plate III.
V. An Elevation of Fire-Proof Warehouses, built on Iron Pillars to admit Carts under them -	} Plate IV.
VI. Proposed Plan for the Improvement of the Port of London, to admit Shipping between the Bridges of London and Blackfriars -	} Plate V.
VII. South Pier of the great Arch of London Bridge; exhibiting its present decayed State; and shewing its being held together only by Iron Cramps: also shewing Two dangerous Chasms in the Centre (1799) -	} Plate VI.
VIII. A Perspective View of the present London Bridge, shewing the Formation of the Bed of the River a few Yards to the Eastward of its Starlings, occasioned by the great Fall of Water -	} Plate VII.

Mr. WILSON's Design for a Cast Iron Bridge with Stone Piers -	} Plate VIII.
---	---------------

Messrs. TELFORD and DOUGLASS's Designs, viz.

1. General Plan for the further Improvement of the Port of London; shewing the Situation of the proposed New Bridge, &c. &c. and Deposite for Coals -	} Plate IX.
2. General Elevation of a Cast Iron Bridge, with a Plan of the Roadway of the Inclined Planes -	} Plate X.
3. Elevations of Designs for Two Bridges; One of Three, and One of Five Arches	} Plate XI.
4. Plans and Elevations of the Inclined Planes, which are to connect the Bridge with the Wharfs and adjoining Streets -	} Plate XII.

Mr. DANCE's Designs, viz.

A. Six Modifications of the general Form and Dimensions of a Bridge of Five Arches -	} Plate XIII.
B. Plan of a Double Bridge, in lieu of London Bridge; affording convenient Passage for Shipping, without Interruption to the Public -	} Plate XIV.
C. Section from North to South of a Design for the same -	} Plate XV.
D. Section from West to East of a Design for the same -	} Plate XVI.
E. Plan, shewing the Position of the Double Bridge, and the proposed Avenues thereto -	} Plate XVII.
F. 1. Sketch of a Design for the Improvement of the Legal Quays between London Bridge and the Tower -	} Plate XVIII.
F. 2. Proposed Improvement of the Legal Quays, and Parts adjacent -	} Plate XIX.

Mr. JESSOP's Section of the River Thames opposite the Steel Yard; shewing its Width, Depth, and Form, and proposed Improvement -	} Plate XX.
---	-------------

Copy of a Design of Sir CHRISTOPHER WREN, for rebuilding the City of London after the Great Fire in 1666 -	} Plate XXI.
---	--------------

A P P E N D I X.

Appendix, (A. I.)

REPORT of Mr. MYLNE, on the State of the River Thames and its Bed; on the Structure of London Bridge, and as to the Navigation of the River above and below it, &c. &c.—With an Appendix and Drawings.

New River Head, May 30th, 1800.

To the Right Honourable LORD HAWKESBURY, Chairman, and the Members of the Select Committee for the better regulating the Port of London, &c.

MY LORD, AND GENTLEMEN,

I WAS honoured with Your Minute of the 9th of May; by which You are pleased to request an Answer to the Questions therein stated.

Minute of
Reference.

1st. Whether I had made any Observations on the State of the River Thames, its Stream, and its Bed; and within what Limits, and for what Length of Time?

2d. Whether I had, at the Time of the last great Alteration of London Bridge, made any particular Observations on its Structure, and whether I could now produce them?

3d. And what, in my Opinion, would be the probable Effect of taking down London Bridge, as to the Navigation of the River, above and below it?

To the First, I am to state, it has been my Lot on various Occasions and Intervals of Time, during 40 Years, to have made Surveys on the whole River, directed some Works therein, and made several Reports of my Opinion, professionally, on the Course of the Thames, from its Source in the *Colts-would-hills*, Wiltshire (where a Canal forms an Inter-course with the Severn and the Bristol Channel) to London, and from thence, by Observations, to the Sea.

In 1760, I was charged with the Duty of erecting Blackfriars Bridge, 1760.
which required a continued and unremitting Attention, by Residence

G

within

within View of that Work for Twelve Years; and various Works erected upon or affecting this River, as to their Motives and Effect, have uniformly been the Employment of leisure Hours, and professional Study.

The ad.

Removing the
old Pier.

Attending
thereon.

Observations.
Appendix.
Plate I.
Drawings (a.)
(b.) (c.) (d.)

Parsons the
Contractor.

Danger.

Drawing the
Piles by
Screws.

The Pier sepa-
rated,
and removed

To the Second Question I beg leave to mention, that while I was laying the Foundations of the first and largest Piers of Blackfriars Bridge, the Works of Alteration of London Bridge (1761 and 1762) were in a State to proceed with the taking up and removing the Pier under the Great Arch of 70 Feet span, then recently finished; and a Lighterman (named *Parsons*) was employed, and contracted with, for a Sum of Money, to remove it totally. This Person happened to be employed also as Lighterman to the Works under my Care, and he consulted me *how* he might best perform that Engagement.

Previous to that Period much Difference of Opinion had prevailed, as to the Manner by which the Foundations of London Bridge had been set down, and originally formed; and different Ways of executing that Work had been published, on this and other such Bridges, in various Parts of Europe. Having collected these Opinions, I attended to the Development of this curious Question, the more especially as no one could have a better Opportunity for such an Investigation.

I committed my Measurements and Observations to Paper; and hereunto annexed the Committee have Drawings, which are Duplicates of those I made on that Occasion.

One of these exhibits a Section, longitudinally, along the Middle of the Bridge, Drawing (a.), setting forth the Parts and Construction of the old Pier, and its Starlings of Defence, as the same proved to be on the Whole being taken to Pieces, or otherwise removed. A Hole was sunk, by Mr. Parsons, in the Ashler-Stone Work, forming *one Side* of the old Pier, and under the Two old Gothic Arches. The Pile Heads, on which the original Structure had been charged, were found in a quadruple Row all round, according to the Figure of the said Pier, and on a much lower Level, compared with the present Low Water Mark, than had been conceived or I had imagined. Seeing this, I then suggested to Mr. Parsons the Ease with which he might perform his Engagement, but that I foresaw a strong Probability of Danger. He borrowed some powerful Screws, used for raising the heavy Wheels of the Water Works, and fastening those to the Heads of the soundest and most secure of the Piles, he detached first some of no great Extent, of the outer Row which formed the Line of Defence, and the Shape of the Starling; and *then*, a few more of the inner and *original Rows* above-mentioned. The Stone Work worth saving being removed, the Rubbish and loose Materials being thrown into the River, and all Cross-Ties by Timber or Iron, being cast loose, the whole Pier soon became a Scene of Ruin, and dissolved away in the Midst of that impetuous Agent *the Fall* under the Bridge. The outer Piles being carried away, the Heart or Middle of the Work was borne off so soon and suddenly, as hardly left any Time to consider and measure its Substance and Texture.

All

All that could float was dispersed up and down the River, and some were preserved (as long as could be) of the original Piles, which the best Accounts state to have been there 586 Years.

The Sense of Danger which I had conceived, was mentioned to several Gentlemen of Authority and Worth, before the Removal was proceeded on; but, the Die being cast, what followed was beyond the Power of Prevention. The original *Bed of the River*, under the Substance of the Pier, had never been exposed to such a rapid Stream before. It was then much higher in Level than any Parts above as well as below the Bridge; its Substance was soon worn away by the powerful Friction; and in proportion as the Space and Depth enlarged, by its being carried off, the Violence of the Stream increased in acquired Power, by the Current being drawn from both Shores and small Arches, augmenting thereby the Violence of a *Volume of Water* greater than ever had existed before.

Original Bed,
high.

Increased
Depth, and in-
creasing Power.

This Corrosion at both Sides of the old Pier spread across the Bottom of the Locks adjoining, and attacked the Stability of the Starlings under the old Piers of the new Arch. Unfortunately, the outer Faces of these Starlings were so close to the Stone Piers, and Six Feet broad only underneath the Haunches of the Great Arch, that no Pile-Engine could act; and there was but little Space to stand and perform any efficient Works.

An eminent Artist was immediately called on, and he advised the only Remedy which could then be put in Execution; Matters having gone so far as they had, and the Case being so urgent. The City Gates, which had been sold, recently pulled down, and stored up at no great Distance, were re-purchased, and thrown into the Gulph, which had been thus formed from the deep Water above, to the deep Water below Bridge.

Danger of the
Great Arch.

This Remedy seems to have been conceived from the Manner in which *Gautier* states the Bridge of *St. Esprit* to be supported and maintained at a constant and great Expense; yet the Whole of the Advice by Mr. Smeaton (the Blocks of Stone in particular) was not followed; nor was the whole of *Gautier's* Account adverted to. That Report (lately published by this Committee) was deliberately framed, and given *after* the Evil had been *thus* averted, and was intended to recommend a further Quantity of 2,000 Tons of irregular shaped Ruble-Stone, to be placed on that which had been first thrown in. That Report was conceived from Questions suggested by himself, more to remove the numerous Complaints arising from the Navigation and Water Works, by the sudden and abrupt Manner in which the natural Cause had deepened this Archway.

Remedy.

Pont St.
Esprit.

Subsequent
Advice.

The first Effort, however, stopped the Evil for the Time, and all was quiet; yet an interesting Discussion took place for Three Years thereafter, and Two more Reports were made thereon. The Removal of the lighter Parts of these Materials still proceeded, from the first Period, slowly but uniformly, and the Effect was accelerated by stopping up some of the smaller Locks or Arches by Dams of Timber, near to the Great Arch, without previous and well-considered Advice as to the Effects probably to be produced therefrom.

Small Locks
stopped.

This

On Requisition
from Water
Works.

This was done, not for the Navigation only, but chiefly an Alteration on Behalf of the Water Works. Increased Velocity formed additional Danger, and Eddys were thus created, in which all Sorts of Vessels were entangled. After a Discussion of great Length, a Compromise was made, between the Interest of having the Current as gentle as possible, under and through the Bridge, and the Interest of maintaining as strong a Current, as might be, for moving the Water Wheels attached to the Bridge. This requires no Explanation. It is most seriously to be lamented, that the Interests of the Public should tend in such different Directions. From that Period, the Stability of London Bridge has been always in questionable Agitation; much Work has been done, but no radical Strength added thereto.

Its future Sta-
bility.

A further Re-
medy.

Does not an-
swer

The Ingenuity of placing *firmly* Nine large transom Beams, in 1793 and 1794, across the Water Way of the Great Arch, at detached Intervals, from the Points of the Starlings above, to the deep Water below Bridge, though well done, has failed of its intended Effect. Nothing can resist the corroding Power and extreme Violence at this wide Passage Way. All of those Timber Frames have been removed, save Two at the upper End; and, if these had been at the lower End, where the greatest Power exists, *they* also would have been borne away before now.

From what I have stated (in addition to what the Committee have been pleased to instruct the Public on this Subject) it may be easily conceived, a Period of Time will arrive, by the Concurrence of Circumstances, that this Bridge may unexpectedly be thrown down, as has been the Case with several old Bridges.

A hard Win-
ter.

Bridge Locks
choaked.

May fall.

Its origin.

History.

Strange Irre-
gularity.

If a severe Winter, such as 1740, should produce large Pieces of Ice, and the Tide should leave them on the broad Shoal Water above Bridge, extending along the Surrey Shore; and if the smaller Arches should be, in the greater Part, choaked by formidable floating Ice, at the Time the Fall is at the greatest, and the *Momentum* thereof increased beyond Example hitherto known or experienced since the Great Arch has been opened, and its Bottom left with the precarious, and, as we have seen, a removable Protection, notwithstanding all the Ingenuity, Perseverance, and Expence bestowed upon it, it is highly probable such a severe Misfortune may happen.

This Stone Bridge, began in 1176, took 33 Years in building. During such a long Period, Parts of the Works must have been borne away and renewed; especially about the Time of closing in the last Parts of its Length, when the Strength of the Current came to its most violent Pitch.

Seventy-three Years after the Bridge was finished, something like a particular Concurrence of Circumstances, produced a Cause which had the Effect to throw down Five of the Arches.

The Irregularity of the Openings, and present Figure of the Arches, from End to End, though hid as much as possible by the *new Sides*, seems to indicate as if most of them had in their Turn successively failed, and had

had been so rebuilt; as well, at least, as the Difficulties attending such Works would permit, without caring for Uniformity in any Respect. Throughout the Whole, this Building stands on its original Bottom, incased with two Sides of new Work (added to it between 1756 and 1770) to preserve the Superstructure. Old State.

And the Piers are incased with a formidable Bulk of Starlings to preserve them from being undermined; save and except however the Great Arch itself, and another called the Drawlock, which in former Times continued many Years to have a Drawbridge over it, for the Passage of Sea Vessels with Corn to Queenhithe.

The History of the Bridges of *St. Esprit* and *Avignon*, over the formidable River of the *Rhone* (which I examined in 1755) and that of London Bridge, are so alike in all Respects, that one would imagine they came from the same Pen, and that they were erected by the same School, if not by the same Artist.

Such in fact, and no better, was the Degree of Science in these arduous Undertakings (during the 12th Century) which produced also in this Country, Rochester, York, Newcastle, and many other Bridges, which have equally suffered from the radical Evils inherent in them, and cannot be cured. Other Bridges the same.

The Stone Work may be said, with *some Truth*, to be such as to last for Ages, if carefully renewed; but, its Figure and Foundations contain the Seeds of sudden, not gradual Dissolution.

I have more Drawings, and other Papers relating to your Second Question; but these Matters, I suppose, will be sufficient on that Head; and I trust will be found useful.

With respect to the Third Question, *what would be the probable Effect of taking down London Bridge, as to the Navigation of the River?* I feel a Necessity of dividing this Part of your Request, in order to make myself understood. The 3d Question.

If the Bridge was totally removed, and Nature restored to its full Power and original Possessions at this Place, there cannot be any Doubt but the Navigation would be here, as at any Place upwards to Fulham Bridge, free, open, and unincumbered, for all the Variety of *Craft* which navigate that Extent of the River. Boats would pass up or down *against the Stream*, equally well as they do now anywhere else; and a greater Quantity of Tidal Water being admitted by the Removal of *that* which obstructs its *Influx* at present, the Intercourse Inland would be enlarged and extended, by as much farther as the Tide will certainly flow. The Re-flow of *that* newly and enlarged Quantity of Water, would scour out the Sand Shoals and muddy Shores, and hurry off all the Filth produced from the Common Sewers, which, through a certain Sluggishness in the Stream, is not cleared away at present. The West Country Barges, and other large *Craft*, would not be detained in certain Parts up the River, through Want of Water in dry Seasons. The upper End of the Tidal Water would swell the natural Waters a long Way further up, Boats.
Tidal Water.
Its Reflow.
Country Barges.

and thereby relieve these Craft from a Demurrage which increases the Cost of the Voyage. This Question pervades the Inland Trade as far as Reading and Oxford.

And upper
Navigation.

If the Pass at London Bridge was free, the Land Floods of the Thames (which annoy its upper Navigation greatly at Times above Kew, to an Extent of Distance and Effect little thought of) would have a ready Passage to the Tides Way and the Sea, and thereby pass off the useless Superabundance more readily, and in such Manner that the Shores and Towing Paths will be used, and Barges pass more freely under the Floors of the Scaffold Bridges of *Chelsea*, *Fulham*, and *Kingston*. The high Waters of the Tides respectively, would be so much higher in this District, and the Velocity so much stronger upwards, that the Voyage would be done in less Time, and with more Safety, through a deeper Water at each Period of the Tide. Some of the Sea Walls, it is true, would be found between this Bridge and Kew, not quite adequate thereto, and would be to be raised by their respective Owners.

Banks or Sea
Walls.

The Valley of the *Thames*, and its contributory Streams, is said to drain 3,870 superficial Miles of Land.

At Boulter's
Lock.

This, in its ordinary State, produces little Effect. It is so scanty of Water during Summer, that it is obliged to be maintained for Navigation by Dams and Weirs across it, into different Stages or Levels, from Lechlade to the lowest at Boulter's Lock, near Maidenhead Bridge.

And these Pens or Falls of Water have been adopted for the Use of Mills and Fisheries.

But, from thence downwards, the Navigation commences to be natural; and, depending on itself till it reaches the Tides Way, it labours under Difficulties which cannot be easier lessened than by admitting great Tides freely, and getting quit of the Land Floods; so that the Power of both being joined, a Scower through London will be effective.

Port of Lon-
don.

Tides.

Sea Vessels.

If it were not for the Tidal Waters making up the lower Part of this River as they do now, the Port of London would be in a very defective State. Every Portion, therefore, which can be admitted from the Impulse of the Sea, and the regular lifting of its Surface, should have free Scope to pass Inland as far as possible, that this mighty Volume of Water may be increased to what it was originally, and long before Navigation could boast of those Vessels which now draw double the Depth of Water

Shoals.

The Shoals and Sand Hills above Westminster Bridge; the long one opposite to Somerset Place; the broad and extensive, as well as most detrimental one to the Navigation, namely, that above London Bridge, extending more than Half across the River, and covering the direct Line of a Lighter's Way to the Great Arch at Half Ebb, and extending in Length 1,700 Feet upwards, to a Point opposite to Queenhithe.

These Shoals, I say, would be all lessened and removed by Degrees, so as to make the Depth of Water at Low Water more uniform, and generally

nerally useful. At first, however, and until the Tide of Ebb shall have obtained and established, for some Time, a freer Course, these Defects would be more visible to the Eye, but yet would not be more detrimental than they are at present, with the small Depth of the Water on them at dead Low Water.

If the Tide of Ebb should not prove sufficiently strong by this acquired Power to remove them, a little Art, and the Industry of the Ballast Lighters to take some of the Substance away, and to put other Parts into Motion, the Whole would be soon removed; and Nature, once cleared of these bad Effects (produced from the Cause under Discussion) would preserve thereafter the Whole in a clean State, fit for Boats to approach any Part of the Shores, and pass freely at all Times along the whole Extent of it.

Some Fears have been entertained that the River in this District would be so emptied of Water, during the last Quarter of Ebb, that nothing could move or be guided during that Time, as at present.

In some Respect this might be true, if *the Bed* was to continue with its present Defects; but that cannot be: For, it should be attended to, that the additional Water passing upwards during Floods, and further Inland, having to return during the *last of the Ebb*, and later in point of Time, will constitute a new Depth of Water, which this District enjoys not at present.

The Whole is Still Water at present, comparatively to what it will be.

It would be well, however, that a more efficient and *positive Authority* was established somewhere, to be grounded on scientific Principle, and pure disinterested Opinion; that some Part of the Shores of this District were embanked and removed forward nearer to the active Stream. I had the Honour to propose an Embankment, which was adopted and authorized by Parliament, from Paul's Wharf to Essex Stairs; and it is now a great Pleasure to observe and mark the good Effects produced therefrom to the Navigation in Front of that Line, and to the Parts adjoining. Another ought to be made from Temple Stairs to Somerset Place Buildings, and continued from thence to the Adelphi; a partial Embankment was made at the Adelphi, by an Act which, though much objected to, has proved of great Use to the Navigation; and a broad one should be made from thence upwards to others, very irregularly and partially set down along the Shores of Whitehall, &c. &c.

Before these Three Embankments were made, I had Occasion to observe that the long Shoal on the Surrey Shore, opposite to Somerset House, extended much farther in Breadth, and longer down the River, forming thereby a Spit of Sand very troublesome to the latter Part of the Ebb Navigation.

That is not so much the Case now; and it was curious to observe, that all Land Floods wore it down on its Surface, and lessened it in its Extent; and

Tide of Ebb.
Ballast Lighters;

their Effects.

Fears ill-founded, by shortness of Water.

Power to make Embankments.

Some of late Years producing beneficial Effects.

Long Shoal at and above Cupar's Bridge.

and that it regularly regained these Diminutions by a Continuance of dry Weather, and the Tides being checked below.

On that Spot a large Embankment being made, so as to cover One Half or more of that Ground which is dry at Times, or with little Water on it at Low Water, would be of great Benefit to all the Property between Westminster and London Bridges.

Power to make these.

Partial Embankments should not be allowed on any Account; and a clear not a negative Power should be constituted, to form and establish those only which may be useful to the general Good. There are some Parts of the River much too narrow; such as those which are formed by prominent Projections, from Thames Street Stairs to the Lead Wharf on the Surrey Shore; and from Dowgate Dock to the Old Swan Stairs on the London Shore, which have certainly been Encroachments formerly. These, if possible, should be thrown back.

Mooring of Barges and Lighters

The Craft of Barges and Lighters in the Coal Trade occupy a great Part of the Area or Surface of the River in this District. They serve for the Warehouse of that Material, as well as to transport it from aboard the Vessels unloading in the Pool. The irregular Manner in which they lay and are moored in Front of Wharfs, where the Breadth of the River is narrow, should be put under strict and vigilant Regulation, and under such Authority as would preserve them from occupying the effective navigable Stream. And all empty Craft whatsoever should be moored in the middle Parts of the River at regular Mooring Chains, in order to lessen the Number of those which deaden the Current along Shore, and render the narrow Parts still more narrow and inconvenient.

between Westminster and London Bridge.

The Bed of the River, between Westminster and London Bridge, might be kept clean by the increased Power and Velocity of the Stream alone, if it was improved by these Measures, and by some Expence being laid out to increase the Depth to a more fair, equal Uniformity, throughout the Whole.

The Particles of Mud and light Matter which remain suspended in Water, while it has a certain Degree of Velocity, are deposited whenever it comes to a Place where it moves with less, and approaches to a quiescent State.

Mud on the Shore.

By that Effect all the Shores of this District are, from Low to High Water Marks, covered with Mud, more or less, in exact Proportion, of great Width and shallow Depths.

Effluvia from Sewers.

The unwholesome Effluvia arising from the Common Sewers, and the Matter generally left on those flat Shores, for Want of a due Velocity in the Thames, are exceedingly noxious. The Bed of the River itself between the Low Water Marks, is perfectly hard and clean, and generally formed of its original Materials, undisturbed. There are, however, some Portions of it where factitious Matter has been added.

Burnt Substances found at Blackfriars.

In laying the Foundations of Blackfriars Bridge I found, unexpectedly, on the London Side, a large Quantity of black Rubbish, and other burnt Matter,

Matter, which was not less than Thirteen Feet in Thickness, with its Surface Eighteen Inches below Low Water.

I found also, from Deeds of Property of the Lands adjoining, that a considerable Embankment had taken place, at Two different Times, near the Mouth of Fleet Ditch, the last being made after the great Fire of London. These explain this Matter, and show, by comparative Soundings and Borings, that the Whole of that Shore had been lined and covered with a considerable Quantity of the burnt Ruins, extending near to London Bridge Water Works.

Embankment
in King
Charles II's
Reign.

In the Second View of *what would be the Effect if London Bridge was removed*, the Good produced therefrom would be more felt at the Situation of the Bridge itself than anywhere else. What I say on this Point will be understood to be on the Hypothesis of proper Provision being made for and in respect of the Water Works, whose Power and Existence is interwoven, at present, with the Bridge itself, and in every Part thereof, inasmuch that they cannot be separated for a Moment's Consideration.

Second View
of 3d Question.

Water Works

During the Seven Hours of Ebb passing through it, nothing can pass upwards; light Boats, a little after High Water, or a little before Flood, can hardly be urged against the Stream by Dexterity and Strength. All Communication and Intercourse, therefore, from below is completely cut off; the same exists with respect to the Duration of Flood, for Five Hours, where no Person can get through it against the Stream; and many there would be who would choose to go by Water, during these suspended large Intervals, on the Concerns of Trade, and the Business of Shipping, were it but in their Power. This is an Advantage only to be imagined, since, by the long Existence of London Bridge, the present Age do not know, and cannot appreciate, how much has been lost, and what they have been deprived of, through the Conduct of our Predecessors. A free Intercourse by Boats, at all Times, and Vessels under Sail, during Part of the Time, would be productive of great Benefit to the Sea and Inland Navigations; that is so obvious, in all the Channels of Trade and Removals of Goods, it need not be insisted on. These Bars and Shoals above and below the Bridge, would be flattened down into the Two deep Trenches which run parallel to it across the River, and which are formidable to Craft, guided by Staves; the former was Twenty-eight Feet, and the latter Thirty-seven Feet depth at the deepest Places. To understand this, I have added a Table, Drawing (d.) as I found the Soundings to be in 1766, and the Section along the Middle of the River, Drawing (c.) By shewing the true Figure of the Bridge and the River, certain serious Truths, little attended to, will add to the Explanation.

Seven Hours
Ebb,

and 5 Hours
Flood, .
a free Passage.

Trenches
cross River.

Plate I. (d.)

Plate I. (c.)

The little Knowledge of that Period which created London Bridge, has handed down to after-times a Structure, which, strange to say, became a Wonder, and even received Admiration.

And, it is stranger still to say, that £.90,000 was laid out, and the Revenues of a large Estate expended, to preserve it.

Cataract
created
thereby.

The Scheme which contracted the Passage Way of a given though a varying Quantity of Water, in a given Time, created a noisy ungovernable Cataract, which has been so little comprehensible, as even to make some wise Men doubt whether, if the Bridge was to be removed, Nature would or could restore herself to the same Situation as before it was erected; and have gone so far as to conceive it would require a *long Time* to do so, even to Hundreds of Years.

A similar
Work on
River Welland,

By way of Illustration I will state a Matter, though on a small Scale, on the River *Welland*, in Lincolnshire. Captain Perry (a Man of Talents) conceived, about 1730, that Sluices constructed across that River above *Spalding*, Seven Miles from the Sea, and penning up the Tidal Waters at High Water, and letting them off at the Period of Low Water, would cleanse out the Bed of that River from thence into the open Sea. The Experiment was tried, by forming the Sluices, Gates, &c. and the only Effect produced was ploughing up and excavating the Bottom just below and next adjoining to that Work, and depositing the Materials so torn up within a very little Distance, after the Rage of the Current had spent its Force, and the acquired Power it had so gained.

and the same
Effect.

It had, and has no Effect, for the main Purpose of cleansing and deepening the Seven Miles Extent from thence to the Sea; yet this Sluice exists, as it was serviceable in *other Respects*, but no Ways useful for a Harbour.

Middle Length
of the Tide
Water in
London,

and the Effect
produced.

The middle Part of the Length of the Tidal Waters flowing up the Thames, would be removed farther up the River if this *Bar* was out of the Way, and that middle or moveable Point being in and about London, would move up and down through it, according to each Tide respectively. If, therefore, the greater Thickness of Tidal Water was so removed further up, and the Stream accelerated, the whole Length from Westminster Bridge to Blackwall would feel the good Effects of it immediately, and thereby do away all Defects between Queenhithe and Iron-Gate, producing in Time other Improvements beyond these Limits.

Soundings.
The Middle
Arch.
Plate I.
Drawing (b.)

I have stated the Soundings in May 1767, along the middle Line of the River, and through the Great Arch, from Queenhithe Stairs to Kings Stairs, Tower Wharf, without attending to the Line of the deepest Water, which is greatly diverted, by the Hills and Shoals of hard Matter, out of its due Course.

Water Way
before London
Bridge was
built.

The Area or Space of Water Way of the whole River at London Bridge. before the same was built, was, by my Measurements, 19,586 Feet superficial, nearly, taking the Width equal to the Length of the Bridge, and the Depth from the Face of its Bed underneath the Arches, up to the visible Marks of the Flow of the Tide on the modern Stone Work. It is reasonable to assume, the Bridge being removed, *that* would be the Space through which the Tidal Waters would flow.

Water Way.

The Water Way of all the Arches or Locks added together, taken from the Surface of the Starlings (which are One Foot Ten Inches out of a Level Endways, and not altogether on a Level with one another cross the

the River), down to the Floors of the Locks respectively, was, in 1767, 3,535 Feet superficial.

The Water Way of all the said Arches, above the Starlings to High Water Mark above-mentioned (deducting the triangular Spaces at the Haunches of each Arch) forms a Space of 4,470 Feet superficial. Now these added together forms the whole Space of 8,005 Feet nearly, and *this* is very much diminished in its Powers by its being divided into Nineteen Parts, One very large, and many others being exceedingly small. It is further diminished in its Effects by Stages and Piles stretching 295 Feet along the Bridge; and by as much as the Water Wheels at their Periphery, do not move so fast as the Current of the Stream in the free Arches, and thereby producing a considerable Retardation of the due Effect there would be if they were not there.

Of the Arches

Diminution thereof.

Many of the Floors of the Locks have been raised to a Degree of no small Danger, and the Outsides of the Starlings have been covered with Planking since 1767; all of which last make considerable Deductions from the Quantity of 8,005 Feet; yet if that Space alone is deducted out of the Area of the Whole, there remains of Solids in this Bridge 11,581 Feet superficial. This is nearly about a proportion of the solid Parts occupying Three-fifths of the River, and leaving only *Two-fifths* for the Passage of the whole River.

Area of Water Way.

Solid Parts.

Let a comparative View be taken of Two other Works erected of late Years, under similar Circumstances of Water Way, Tidal Waters, and Situation. See Drawing (a.)

The same of Westminster Bridge.

Plate 1. (a.)

The Water Way at Westminster was, before the Bridge was built, about 19,010 Feet superficial. The Water Way of all the Arches or Openings are now about 14,768 Feet superficial, and of course the solid Parts of Piers, &c. occupy a Space opposed to the Stream of 4,242 Feet superficial only.

The Water Way at Blackfriars was between the present Shores, before the Bridge was built, 19,083 Feet superficial. The Water Way of all the Arches or Openings are 15,081 Feet superficial, and of course the solid Parts of the Piers, &c. occupy a Space in like Manner of 4,001 Feet superficial only.

The same of Blackfriars Bridge.

The Proportions of these Three Structures, in these Respects, stand thus:

The Three Bridges in the Order they were built.

	Area of River.	Solids.	Water Way.
London Bridge - - - - -	19,586	11,581	8,005
Westminster Bridge - - - - -	19,010	4,242	14,768
Blackfriars Bridge - - - - -	19,083	4,001	15,082

The Cause which has produced the present dangerous Navigation has now been stated, and its Defects will be perfectly understood. The Degree of that Danger, and these Imperfections, has been exhibited in a Manner which, I trust, meets the plainest Understanding.

If

If the Piers had been founded of durable Materials, as low as the Bottom of the River is now above and below the Bridge, there would not exist any Danger to this Fabrick. The clumsy Sides of the Starlings might be stripped off, and the Water Way be enlarged, so that the Navigation would then be tolerable, though not fitting a River of such important Business. But that Diminution of the Piers cannot be so much as attempted, without the Whole tumbling into the Pit which its present Proportion has dug for itself.

The present Starlings may be cut down to Low Water Mark, but that would be equally dangerous; inasmuch as the strongest Portion of the Bondage, by which they are held together round the original Piers, is in the Cross Tyes which holds the Heads of the Piles together, and *that* is wholly between the Surface of the Starlings and Low Water Mark, a Height of Five Feet and a Half; and new Tyes cannot be placed lower. More might be said, but less is sufficient to you.

Last Part of
3d Question.

I pass now to the last Part of the Question, *as to the Effect below Bridge, were it removed.* The precipitate Fall from the Surface or Bottom under the Arches into the deep Hollow, of Thirty-seven Feet in the very short Length of Seventy Feet only, and the gentle Rising from thence up again to the Level of Low Water Mark (where the present Bed leaves no Water at that Period to be passed through, but a broad and extensive Shoal), constitutes at once the extreme Danger of the Bridge, and an Obstruction to all Navigation during the latter End of the Ebb.

Shoals.

Other Shoals, of varied Forms, Positions, and Extent, exist further downward, as far as Traitors' Bridge, and even to Iron Gate Stairs.

So far the Effects, produced by the Violence of the Fall, extend; First, by moving the Soil out of the Bottom close to the Bridge, to another Part opposite to Billingsgate Stairs, 350 Feet distant only; and, Secondly, by lengthening out that Effect by the Deposition of light Matter along the Front of the Tower, where no Vessels of any Draught of Water can pass with Safety, unless it is in Spring Tides, and being warped close along Shore.

Trinity House
Lighters.

I should apprehend the Whole of these varied Shoals and Shoal Waters, occupying such a valuable Part, would be converted into *deep Water* in a short Space of Time; especially if the Trinity House Duty, in the Service of the Public, was pointed and employed for that Purpose, to aid and assist such an important Desideratum. Admitting this possible, the Idea of removing the Custom House and Legal Quays would be superseded.

Horfeing
Water.

In this District, the Navigation of the numerous Craft from above Bridge is suspended during the latter Part of the first Half of the Ebb, through the Fear of getting on the Starlings at the Time of what is called *Horfeing Water*; and during the latter Part of the last Half of Ebb they are interrupted also by *these* Shoals, although they could pass through Bridge. In fact, it is a Mystery and Profession to navigate through this Bridge; so much so, that the Craft of the Inland Navigation cannot venture into this complicated

plicated Danger for the Purpose, highly useful, of delivering their Cargoes alongside of a Vessel in the Pool, or taking a Cargo in return.

Billinggate should in rights be removed to a Space of Ground above and adjoining to Tower Stairs, for the Purpose of relieving the crowded Scene about the Custom House. From Iron Gate Stairs downwards, the River is very clear of common Obstructions, now, that in this distant District, the Rage of London Bridge Fall ceases to produce any other Effect than above-mentioned. There, the deepest Water lies on the North Shore, which, no Doubt, is owing to the Mooring Chains having chiefly been long established on that Side. The numerous Vessels which are constantly moored there at regular Distances, produce an Effect of deepening the River, and preserving it so. For, the Line of deepest Water taken longitudinally, is found to be undulating on its Surface; with the deeper Parts immediately under the Ships Bottoms, during the Ebb, corresponding thereto.

Billinggate.

Mooring
Chains;

their Effect.

The whole District, as far as Limehouse Hole, preserves a good and deep Water, and can only be improved by a more powerful Re-flow of Tidal Water through it, when aided by a strong *Fresh* from the Land Waters on high Spring Tides at the Equinoxes.

Limehouse
Hole.

At such Periods, London Bridge being removed, and a strong North East Wind prevailing, all minor Shoals and Banks would be soon borne away, as they derive a Kind of Protection *now* from that very Cause which created them.

One Shoal however, and the Shoal Water near it on the South Shore, of great Extent, deserves particular Notice.

In the Midway between Limehouse Hole and the deep Water at Redriffe, this Shoal extends from Kingsmill Stairs to Globe Stairs, and it seems to be formed and preserved in its present Shape, &c. by the Concurrence of Two Causes; to wit, the Tide of Flood setting upwards along the North Shore from the Curve at Limehouse, causes Slack Water on *this Ground*, and along that Part of the Surrey Shore. The Tide of Ebb is inverted by the Curve at *Redriffe*, and leaving the Surrey Side, returns along the North Shore in a like Manner; so that this Portion of the River is deprived of that Strength of Current, *at all Times*, which keeps other Places clear and of an equal Depth.

Shoal on Surrey
Shore.

Redriffe.

The only Remedy for this, and doing away also a small Shoal in the Mid Stream, and a smaller one on the North Shore at Bell Wharf, would be to embank the River, and add to the Land along the South Side to the Extent above-mentioned, according to a well-considered Line for that Purpose. From thence downward nothing occurs but the *Mud of Cuckolds Point*, which may be encroached upon by new Wharfing to be established further out; and a Shoal of great Importance, opposite to and a little above the *King's Dock Yard* and Victualling Premises.

Cuckolds
Point.
Deptford
Dock Yard.

The District from Limehouse to Greenwich, takes a Figure the exact Form and Counterpart of the one above-mentioned, up to Redriffe. In

Above Green-
wich.

Charles Se-
cond's Reign.

the Midway of its Length the Shoal and Shoal Water lies on the East or Middlesex Side of the River, which, by its Position, is safe from the Effect of the Tide of Flood passing along the Deptford Side; and also from the Tide of Ebb which is thrown over by the Limehouse Curve to the same or Western Shore also. This Shoal, and its Effect on the Navigation, &c. occasioned an ample Discussion in Charles the Second's Time. The Ballast Lighters proved of little Effect towards reducing it, and new Engines were invented. Still it remains, and will do so, as a natural Defect, arising from the Figure of the River on that Side of the Isle of Dogs.

It is possible, however, to do it away; but yet it must be, at all Events, treated with a gentle Hand, for fear of a worse Evil; the Width of the River at this Place is necessary to Vessels working up with the Flood against the Wind; and, *vice versa*, in working down.

From Green-
wich to Black-
wall.

In the Midway between Greenwich and the deep Water at Blackwall, where the River takes a Turn the Reverse of the last mentioned, there is in like Manner a Shoal and Shoal Water attached however to the North or Middlesex Side. A recent View and Examination convinces me, that deeper Water might be obtained in this Place, and the Width of it enlarged, if an Addition was made to the Shore all along in Front of the Folly House.

But, however, as the Entrances to be formed to *the Cut* across the Isle of Dogs and to the West India Docks, will require Works to be set down on that Shore for the Purpose of Vessels *bringing up*, it would be useless to say any Thing which might prove premature.

Sailing Light-
ers from below,
through
Bridge, to
Westminster,
&c.

I need not trace the Effects of removing London Bridge further down, as to the Bed of the River; but a great deal more might be said on that *Trade and Carriage of Goods* which are consumed in London, &c. and brought from both Shores as far down as *the Nore* in Craft not fit for the open Sea. A safe Passage at all Times at London Bridge would extend that Trade in Quantity, and render the Carriage thereof cheaper.

The Act of 1755, for repairing and improving that Bridge, has fallen short of its Purpose in respect of the Navigation; and the little it did effect, has rendered it more precarious in Stability.

I have the Honour to be,

My Lord and Gentlemen,

Your most humble Servant,

Robert Mylne.

Appendix, A. 2.

BORINGS of the RIVER betwixt LONDON and BLACKFRIARS BRIDGE; performed betwixt the 19th May and 16th of June 1800, by JOHN FOULDS and Assistants.

BLACKFRIARS BRIDGE.

Albion Mills Coal Wharf.		F. I. Water at Low Water 1 6 Coarse Sand - - - 2 0	F. I. Water at Low Water 9 0 Coarse Gravel - - 3 0	F. I. Water at Low Water 8 1 Black fine Gravel - - 2 6	Puddle Dock.
		Coarse and fine Red } Gravel - - - } 8 6 12 0	 12 0	Light Sand - - - 1 5 12 0	
Mason's Stairs.		F. I. Water at Low Water 7 11 Black Gravel - - - 1 5	F. I. Water at Low Water 6 8 Coarse Gravel - - 3 0	F. I. Water at Low Water 6 6 Black fine Gravel - - 3 0	Paul's Wharf.
		Brown Gravel and Sand } 2 8 12 0	Red Sand with Gravel } 2 4 12 0	Loose fine Sand Brown } 2 6 12 0	
Thames Street.		F. I. Water at Low Water 3 0 Coarse Sand - - - 0 9 Blue Clay - - - 1 0	F. I. Water at Low Water 8 3 Coarse Gravel - - 1 0	F. I. Water at Low Water 8 5 Black Gravel with Shells 3 4	Brook's Wharf.
		Coarse and fine Red } Gravel - - - } 7 3 12 0	Light Sand and Red } Gravel - - - } 2 9 12 0	Light Gravel with Sand } 0 3 12 0	
Bear Garden.		F. I. Water at Low Water 2 4 Coarse Brown Gravel 3 6 Light Blue Clay - - 1 6	F. I. Water at Low Water 13 0 Bottom Coarse Gravel.	F. I. Water at Low Water 6 4 Fine Black Gravel - 5 8	Three Cranes.
		Light fine Gravel } with small Stones } 4 8 12 0	 12 0	 12 0	
Bank End.		F. I. Water at Low Water 1 0 Brown Gravel - - 2 0 Blue Clay, very tough 4 0	F. I. Water at Low Water 10 6 Coarse Gravel - - 1 6	F. I. Water at Low Water 13 0 Bottom Coarse Gravel.	Dowgate.
		Light Brown Gravel } with Sand - - } 5 0 12 0	 12 0	 12 0	
Between St. Saviour's and Peacock's Wharf.		F. I. Water at Low Water 2 6 Black Gravel - - - 2 0	F. I. Water at Low Water 8 6 Black Gravel - - - 3 6	F. I. Water at Low Water 12 6 Black Gravel Bottom.	Between Allhallows and O'd Swan Stairs.
		Gravel with Red Sand } 7 6 12 0	 12 0	 12 0	

CITY SHORE.

Appendix, A. 3.

STATEMENT of the Average Draught of Water of Ships, &c. when loaded and in Ballast; and the Heights of their Masts above the Water, when in Ballast trim.

S L O O P S.

NAMES.	No. of Tons.	Trade.	Draught of Water when loaded.	Draught of Water when in Ballast.	Lower Mast Head above the Water.	Topmast Head above the Water when struck.	Topgallant Mast Head above the Water when struck.	Topgallant Mast Head above the Water when all an End.
Liberty - - -	50	Corn - -	7 0	4 0	56 0	— —	56 0	70 0
Mater - - -	50	Coast - -	9 0	6 0	58 0	— —	58 0	68 0
Goodwill - - -	50	Coast - -	11 0	7 0	56 0	— —	— —	56 0
Owner's Goodwill	58	Coast - -	8 0	5 0	58 0	— —	58 0	68 0
Fortune - - -	64	Corn - -	9 0	5 0	54 0	— —	54 0	70 0
Stanley - - -	69	Corn - -	8 0	5 0	55 0	— —	55 0	61 0
Ann and Sarah -	75	Corn - -	9 0	6 0	52 0	— —	— —	65 0
Mary Ann - - -	80	— —	9 0	7 0	45 0	— —	45 0	61 0
Happy Return -	100	Corn - -	9 0	7 0	55 0	— —	55 0	87 0

B R I G S.

Good Intent - -	65	Coal - -	9 0	6 0	36 0	40 0	56 6	64 6
Fox - - - -	81	Fruit - -	10 0	6 0	38 0	42 0	62 0	73 0
Free Briton - -	86	Coast - -	10 0	6 0	37 0	41 0	48 0	60 0
Ashley - - -	100	Yarmouth -	10 0	5 0	40 0	44 0	57 0	69 0
John and Mary -	106	Baltic - -	11 0	6 6	50 0	54 6	70 0	80 0
Claremont - -	112	London - -	14 0	8 0	52 0	56 6	70 0	82 0
Gainsborough -	134	Coaster - -	11 8	7 6	51 0	56 0	75 0	85 0
Brazil - - -	150	America - -	10 6	7 0	44 0	49 0	73 0	83 0
Nelson - - -	150	America - -	10 6	7 0	44 0	49 0	73 0	83 0
Betsey - - -	150	America - -	11 0	7 0	50 0	55 0	73 0	85 0
Zephyr - - -	154	Newcastle -	14 0	7 0	56 0	61 0	74 0	84 0
Swift - - - -	167	Coal - -	13 0	8 0	56 0	60 0	74 0	86 0
Sally - - - -	199	Coal - -	12 8	8 0	44 0	49 0	81 0	86 0
Good Intent - -	200	Coal - -	13 0	8 0	49 6	54 6	74 0	84 0
Eliza - - - -	200	Coal - -	15 3	9 0	48 0	53 6	74 0	90 0
Edgar - - - -	203	Coal - -	13 6	7 9	57 0	62 6	77 0	89 0
Noble - - - -	206	Baltic - -	15 0	9 6	59 0	63 6	79 0	90 0
Guardian - - -	220	Coal - -	12 3	7 0	57 0	62 6	77 0	89 0
Dolphin - - -	250	Coal - -	14 6	9 0	54 0	59 6	98 0	102 0
Alfred - - - -	286	Coal - -	16 0	9 6	61 0	66 6	88 6	112 6
Æolus - - - -	208	Baltic - -	14 0	8 6	60 0	65 6	81 0	102 0
William - - - -	300	Baltic - -	13 8	8 10	52 6	58 6	78 0	90 0

(continued.)

SHIPS.

NAMES.	No. of Tons.	Trade.	Draught of Water when loaded.	Draught of Water when in Ballast.	Lower Mast Head above the Water.	Topmast Head above the Water when struck.	Topgallant Mast Head above the Water when struck.	Topgallant Mast Head above the Water when all an End.
Adriatic - - -	200	West Indies	12 0	7 0	38 0	43 6	72 0	88 0
Lioness - - -	222	Baltic - -	15 3	9 6	59 0	64 6	90 0	96 0
Brothers - - -	280	London - -	13 0	9 0	56 0	61 6	89 0	113 0
Elizabeth and Sarah	255	Coal - -	15 2	9 6	59 0	64 6	92 0	104 0
King George -	283	H.B. Company	14 0	10 0	56 0	61 6	89 0	106 0
Mars - - - -	286	Coal - -	15 0	9 0	56 0	61 6	89 0	113 0
Union - - -	286	West Indies	16 0	10 6	56 0	61 6	79 0	96 0
Content and Peace	300	Coal - -	15 7	9 6	66 0	71 6	92 0	102 0
Penelope - - -	310	Baltic - -	15 0	10 0	57 0	62 6	88 0	108 0
Iris - - - -	386	E. Country	16 0	8 6	63 0	68 6	106 0	124 0
Minorca - - -	400	Baltic - -	17 6	11 0	57 0	63 0	86 6	102 0

Perry's, Wells's, and Green,

Randall and Brents,

Frances Barnardsons and Roberts.

Appendix, (A. 4.)

STATEMENT of the Average Draught of Water of Loaded Merchant Vessels, in proportion to their Tonnage; distinguishing the same, according to a progressive Scale, from Fifty Tons to Seventy-five Tons, One Hundred Tons, One Hundred and Fifty Tons, Two Hundred Tons, Two Hundred and Fifty Tons, and Three Hundred Tons: And also of the Average Proportion between the Tonnage and Height of Mastings of Merchant Vessels in Ballast, above the Water Mark, from Fifty Tons to Three Hundred Tons, upon the like progressive Scale; distinguishing the Difference of Height, depending upon the different Mode of rigging each Class, made by the Master, Wardens, and Assistants of the Corporation of Trinity House of Deptford Strond; per Order of the Committee of the Honourable House of Commons, appointed to consider of such further Measures as may be necessary for rendering more commodious, and for better regulating, the Port of London.

TONNAGE.	Breadth for Tonnage.	Length of Keel for Tonnage.	Draught of Water when loaded.	Length of Lower Masts above the Ballast Water Line.	Length of Topmast from Cap to Cap.	Length of Topgallant Masts.	Length of Royal Masts.	Total Height of Masts above the Ballast Water Line.	Mode of Rigging.
Tons.	Feet.	Feet.	Ft. In.	Feet.	Feet.	Feet.	Feet.	Feet.	
50	15	42	7 6	54	—	—	—	54	Sloop.
75	17	49	8 9	60	22	—	—	82	D ^o
100	19	53	10 0	65	24	—	—	89	D ^o
—	—	—	—	52	21	11	—	84	Brig.
150	22	59	12 4	55	25	12	—	92	Snows or Ships.
200	24	65	14 0	57	28	13	—	98	
250	25	75	15 0	60	31	14	9	114	
300	26½	80	16 0	62	33	16	10	121	

The Elder Brethren beg leave to observe to the Committee, that as the Ship Builders, at every Port in the Kingdom, may vary in some Degree from this Scale, so the Mode of Rigging is no less arbitrary, every Owner and Master deviating from this Scale in a greater or less Degree: But this Scale being formed on a general Principle, the Brethren offer it to the Committee, as best fitted to assist their general Calculations upon the Subject.

By Command of the Corporation,

James Court, Secretary.

Trinity House,
27th March 1800.

Appendix, (A. 5.)

AN ACCOUNT of the Total Number of Ships, with their Tonnage, that entered Inwards, and cleared Outwards, at the Port of London, to and from Foreign Parts, in the Year 1799.

INWARDS.						OUTWARDS.					
British.		Foreign.		Total.		British.		Foreign.		Total.	
Ships.	Tons.	Ships.	Tons.	Ships.	Tons.	Ships.	Tons.	Ships.	Tons.	Ships.	Tons.
1,934	441,468	1,480	232,005	3,414	673,473	1,310	304,745	1,208	216,566	2,518	521,311

J. Dalley, pro Reg^r Gen^l.

Appendix,

AN ACCOUNT of the Total Number of Ships, with their Tonnage, including their
Year 1799; distinguishing the Countries from whence such Ships

C O U N T R I E S.			British.		Foreign.		Total.	
			Ships.	Tons.	Ships.	Tons.	Ships.	Tons.
America	{	British	46	10,514	—	—	46	10,514
		Foreign	9	1,982	146	33,685	155	35,667
Africa			5	474	1	120	6	594
Azores			2	133	4	462	6	595
Barbary			4	465	1	50	5	515
Bremen			18	2,611	35	4,489	53	7,100
Canaries			—	—	4	556	4	556
Cape of Good Hope			5	852	—	—	5	852
Courland			2	262	—	—	2	262
Dantzic			61	13,824	88	17,277	149	31,101
Denmark and Norway			17	3,414	244	61,712	261	65,126
East Indies			52	38,751	3	1,305	55	40,056
Flanders			—	—	9	528	9	528
France			—	—	22	2,394	22	2,394
Germany			148	26,270	87	14,528	235	40,798
Gibraltar and Streights			40	8,294	1	201	41	8,495
Greenland and Davis's Streights			22	6,417	—	—	22	6,417
Guernsey, Jersey, Alderney, &c.			52	6,503	2	250	54	6,753
Holland			126	32,093	49	5,273	175	37,366
Honduras, Bay of			3	610	2	520	5	1,130
Ireland			251	29,115	1	310	252	29,425
Italy			1	109	—	—	1	109
Leghorn			5	868	10	1,531	15	2,399
Livonia			51	10,822	1	300	52	11,122
Madeira			3	590	—	—	3	590
Minorca			2	675	—	—	2	675
Naples			—	—	2	296	2	296
Portugal			139	24,403	46	5,614	185	30,017
Prussia			117	20,286	469	40,542	586	60,828
Russia			265	64,558	5	1,710	270	66,268
Sicily			10	1,245	10	1,649	20	2,894
Southern Fishery			24	6,603	—	—	24	6,603
Spain			—	—	92	13,814	92	13,814
Sweden			8	2,033	133	20,009	141	22,042
Turkey			—	—	1	500	1	500
Venice			1	248	3	450	4	698
West Indies	{	British	327	97,903	—	—	327	97,903
		Conquered	114	27,582	5	1,100	119	28,682
		Foreign	4	959	4	830	8	1,789
Total			1,934	441,468	1,480	232,005	3,414	673,473

6. *ated Voyages, that have entered Inwards, at the Port of London, from Foreign Parts, in the*
with the principal Articles of Importation from each Country.

PRINCIPAL ARTICLES OF IMPORTATION.

Furs, Fish, Skins, Corn.

Tobacco, Corn, Rice, Indigo, Furs, Wood.

Fruit, Wax, Gum, Elephants Teeth, Guinea Wood, Palm Oil.

Fayal Wine.

Copper, and some of the Articles under the Head of Africa.

Linen, Corn, Timber, Wine.

Wine.

Aloes, Train Oil, Whalefins, Wine, Corn, Indigo, Cotton Wool.

Iron, Deals.

Corn, Timber, Deals, and some Linen.

Fir, Timber, Deals, Corn, Iron.

Tea, China, Drugs, Calico, Muslin, Nankeens, Pepper, Raw Silk, manufactured Linens and
 Hemp, Silk, Brandy and Cotton. [Cottons, Sugar, Cotton Yarn, Saltpetre.

Oil, Wine, Fruit, Cotton, Glafs, Brandy, Plaister of Paris, Madder.

Linen, Linen Yarn, Timber, Deals, Wine, Corn, Smalts, Hides, Rags, Oak Bark, Skins, and now
 Silk. [Streights Silk, Brandy, Geneva.

Blubber, Whalefins.

Paving Stones, Wine.

[Cast Iron, Linen, Provisions, Seeds, Skins, Furs, Snuff, Cotton.
 Corn, Wine, Geneva, Brandy, Wainscot Boards, Oak Bark, Drugs, Madder, Smalts, Flax, Hides,
 Logwood, Mahogany, Fustic.

Provisions, Linen Yarn, Linen, Cattle, Corn, Skins, Hides, Tallow, Woollen Yarn.

Silk, Oil, Wine, Marble, Chip Hats, Fruit, Paper, Drugs.

Rags, Madder, Valonia Skins, Cotton.

Hemp, Iron, Deals, Timber, Masts.

Wine.

Silk, Wine, Barilla, Cotton Wool.

Fruit, Oil, Skins.

Wine, Fruit, Cork, Salt, Cotton.

Timber, Corn, Skins, Linen Yarn.

Masts, Iron, Deals, and other Timber, Linen, Tallow, Hemp, Pitch, Tar, Ashes.

Brimstone, Barilla.

Oil, Whalefins, Spermaceti, Skins:

Wine, Fruit, Oil, Barilla, Skins, Wool, Hides, Drugs, Cork, Brandy.

Iron, Corn, Deals, Pitch, Tar.

Fruit, Mohair, Cotton, Carpets, Box Wood, Madder, Gums, Opium, Silk.

Fustick, Fruit, Drugs.

Sugar, Rum, Coffee, Cocoa, Cotton, Indigo, Mahogany, Dying Woods, Fustic, Ginger, Gum,
 Drugs, Hides, Tortoiseshell, Wine.

J. Dalley, pro Reg^r Gen^l

Appendix, (A. 7.)

PORT OF } AN ACCOUNT of the Total Number and Tonnage of Ships in the Coasting
LONDON. } Trade, which entered Inwards, and cleared Outwards, at this Port, in the
Year 1799; distinguishing Colliers from other Vessels, and also distinguishing
the Number of Ships in each Branch, as follows: viz. under 100 Tons, from
100 Tons to 150 Tons, from 150 Tons to 200 Tons, from 200 Tons to 400
Tons and upwards, so far as the same could be ascertained.

	Under 100 Tons.	Above 100 Tons and under 150 Tons.	Above 150 Tons and under 200 Tons.	Above 200 Tons and under 400 Tons.	Tonnage.
7,265 Coasters	6,271	878	99	17	519,516

3,898 Colliers Average at 228 Tons each 892,362

11,163 Total Number Total Tonnage 1,411,878

4,913 Vessels cleared Outwards.

6,250 Colliers and other Vessels which leave this Port in Ballast, or clear out to Foreign Parts.

Chas. Welstead, p. Colr.

J. Hassard, D. Contr.

Coast Office, London,
19th June, 1800.

Appendix, (A. 8.)

AN ACCOUNT of the Tonnage of Shipping Inwards and Outwards, frequenting all the Out
Ports, for the Year 1799.

INWARDS.			OUTWARDS.		
British.	Foreign.	Total.	British.	Foreign.	Total.
Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
771,776	203,032	974,808	840,569	174,046	1,014,615

J. Dalley, pro Reg^r Gen^l

Appendix, (B. 1.)

Mr. DODD's ACCOUNT of LONDON BRIDGE; with Ideas for a New One,
with Wharfs, Warehouses, &c.

To the Honourable the SELECT COMMITTEE of the House of Commons,
on the Improvement of the Port of London.

GENTLEMEN,

I N illustrating the Plan I have the Honour to submit to your Consideration for the Improvement of the Port of London, I shall endeavour to be as brief as possible, and will at a future Period, if necessary, enter further into Detail.

My Idea is, that a Variation be made in London Bridge, or a New One built, which will admit Ships of 500 Tons Burden to pass under it, (see the Plan, N^o I.) which may be done without in the least preventing the passing and repassing the present Bridge as usual, until the more elevated extended recommended Arch is finished fit for Service, which may be executed either with Iron or Stone. A practical Demonstration of the Possibility of erecting such Arches for the passing of Ships, &c. is exemplified in the Erection of the Bridge across the River Wear, at Sunderland, whose Span is 236 Feet by 100 in Height. This important Improvement would unlock that great and extended Part of the River Thames, skirting Part of the City from London to Blackfriars Bridge; which will be one of the grandest Improvements the Metropolis of this Kingdom is capable of receiving; for from each of these Bridges on either Side of the River, extensive Ranges of Quays or Warehouses might be erected, for the Facility of Commerce, and Protection of the Revenue, (see the Plans, N^o I. III. V. & VI.) This Space contains 3,353,180 Square Feet, and may contain near 1,000 Sail of Ships, such as usually navigate the Pool, and will be near the Centre of Commerce, must add to the Comfort, Convenience, and Magnificence of this great Commercial City. The dotted Lines on Plan, N^o III. represent the Line of the Bridge as proposed to be erected over the old one, which if 100 Feet High, will reach to St. Thomas Street on the South, and to Monument Yard on the North, with an Incline or Ascent of $2\frac{1}{2}$ Inches in the Yard; but if reduced to 80 Feet, only 2 Inches; through the former of which Ships may sail with their Topmasts standing, in the latter they must strike them. From a late Survey I have made, it appears to me highly necessary to build a new Bridge (See the Plan, N^o VII.) for which there is an excellent Situation a little above. The present Bridge cannot be substantially repaired, without which, from the dangerous State of some of the Arches, Piers, and

Appendix.
Plate II.

Appendix,
Plates II. III.
IV. and V.

Plate VI.

and Starlings, it would not support the additional Weight of a new Bridge upon it; its Foundation appears to be daily undermining by the Force of the agitated Water rushing with such Violence through its confined Arches. The Water Works annexed to the Bridge, they may be wrought by Steam, a more faithful Agent, which Slack Tides and Frosty Weather would not delay. To enter hidrostatically into all the Reasons for an Alteration in London Bridge, would occupy many Pages; but permit me to remark that many Persons for Want of Information, assert, that any Measure that would admit of more Water through the Bridge, would injure the Navigation above, by admitting to run off too early, and leave the Country destitute till the next returning Flood, but it is an invariable Law of Nature that whatever tends to give a River a greater Influx on a Flood Tide, will be the sure Cause of giving it a greater and longer Reflux on an Ebb Tide. An ocular Demonstration can frequently be obtained at the present Bridge, of a great Quantity of Water, to the Height of near Two Feet, being prevented entering up the Country, which would be of the greatest Utility to the Upland Navigation, as it would carry the Flood farther up the Country, and of course make more Water higher up the River. The Height of all Waters running in to fill Rivers, depends upon the Height they rise to in the Offing at Sea, subject to be aided or retarded in entering Rivers by stormy Winds. But how is it possible for all that Water which Nature has provided to pass London Bridge in its present State, whilst the Piers and Starlings act as a Preventative; thus the impellent Force of the Flood receiving its Power from the Sea, is checked by the present Bridge, whereas the one I have the Honour to propose, will admit the Water to flow through it in the most placid Manner. To use a Figure, all Rivers that receive a Flood Tide, are filled by one Wave from the Sea, and press forward on the Strength of the Force received like Spherical Figures up an inclined Plane, and run till their Velocity is exhausted, and then return; and according to the Straightness of the Lines or Boundaries of its Course, is its Velocity aided or retarded.

Appendix,
Plate V.

What are the Means to be attended to for the obtaining of such desirable Ends? First, I should recommend regular Quay-Walls to be built on both Sides the River, as described on the Plan, (N^o vi.) I had the Honour of communicating to you, whose regular Lines will admit of the Waters flowing in the gentlest Manner possible; for the general Cause of Shoals in Rivers is the Waters being thrown into Eddy by serpentine and circuitous Lines, or some Body or Bodies preventing or obstructing the Tide's regular Fall of Plane; as such, when it is made stationary, Gravity causes a Discharge of its Contents, whether it be Sand, Gravel, or Silt; the same Cause is demonstrable, by Fluids driving or impelling Rubble Stone, or larger Bodies, along the Bottom of Rivers. But, from the regular Line of those Quay-Walls, and the River being contracted and straitened thereby, we have no Right to expect the future Accumulation of Shoals after they have been once cleared away. The Widths of the proposed Quays will be various, from 40 Feet to 250, and will con-

tain

tain 1,089,100 Feet, or 121,011 superficial Yards. Immediately after the Erection of those Quay-Walls, a general Excavation of the River should take place, on account of there being Shoal Water in some Places, yet in the Channel generally about 12 Feet at low Water, but the Whole may be excavated to 18 or 20 feet at low Water, a sufficient Depth for any Merchant Ship that may use this Part of the Thames. Sometimes the getting rid of excavated Soil is more difficult and expensive than the Mode of obtaining it; but here it will be immediately thrown aback of the Quay-Wall, to make permanent Foundations for the Erection of Warehouses, &c. (see the Plans, N^o 1. III. & v.) which I propose to be built upon Iron Pillars and circular Groins, with all their Parts incombustible, and leaving a sufficient Height underneath them for all the Purposes of Commerce. The same Crane that takes the Goods out of the Ship alongside those Quays or Wharfs, may, when necessary, deposit them in the Warehouses, without landing them. A more perfect Way of preserving Property from Plunder cannot be obtained. Suppose, for Instance, a Ship delivering Bond Goods; immediately after they are taken from her Hold or Deck, they could be safely deposited in the King's Warehouses, where all the Acts of weighing, overhauling, &c. can be as well performed, and with more Security than on an open Quay. Those Quays I propose to be protected from Plunder by Iron Portcullisses, only to be drawn up when necessary, and if thought advisable, a Canal may be made behind for to keep a Communication with the present Wharfs, in which Case the proposed Quays will be perfectly insulated, and no Access to them but by Means of Drawbridges. Vessels may moor alongside the Quays, or to Dolphins without the usual Wear and Tear of Anchors and Cables. This upper Pool, when completed according to the general Plans I have advanced, would be the happy Means of making London the first Sea Port in the Universe, and the greatest Emporium of Trade in Europe. By this Plan, Commerce will be brought, as it were, to the Back Door of every Citizen. Does the Merchant want a Deposit for his Goods near the Heart of the Metropolis? it is impossible for him to be better accommodated than here. Does the Mariner want a Place of Security to lay his Vessel when burthened with a heavy Load, so that she may not come near the Ground? here he may also be amply accommodated.

Plates II. III.
and IV.

A Question may arise from some Gentlemen who have not had Opportunity to make Observations on the Deepening of Rivers, will not the proposed Excavation speedily fill up again? To which I reply in the Negative, and from many Years Practice, and ocular Remarks, I have found, that to contract, straiten, and deepen a River, according to the Plan I have given, instead of filling up, in Time it would even deepen itself. Let it for a Moment be considered, the serpentine Form of the River between the Two Bridges, which is on an Average about 970 Feet in Width, which I propose to contract to 600 Feet, and to form its Lines or Boundaries into as strait Lines as possible, thereby effectually preventing all Eddies, the real Cause of the Accumulation and Growth of Shoals. A River like this, so amply supplied with back Water,

N

may

may be much increased by a large Portion of Water being admitted through the Variation of London Bridge. But, granting that no Excavation was to take place, there is on an Average 12 Feet at Low Water, a sufficient Depth for most of the Colliers, and all the Coasting Trade from every Part of the Kingdom, using the Port of London, as well as many other foreign Vessels not exceeding 250 or 300 Tons, built on the Flat-floored Principle: But, if the River be deepened in proportion to the Section of its Width cut off, it may be excavated to 18 or 20 Feet at Low Water, and will remain in that State. Demonstrations of which may be drawn from Places in the Rivers Tyne, Wear, and Tees, with many others in this Kingdom. This Space between the Two Bridges, although contracted to 600 Feet in Width, the Length between the Two Bridges being 40,000 Feet, will contain 920 Ships, on a Scale of 30 Feet Beam, and 120 Feet in Length from the Taffel Vail to the Bowsprit end, leaving 180 Feet for a Midway Passage for Craft, &c.

In the following general Estimate, I have not included the Expence of erecting the Warehouses upon the Embankments, supposing they would be built by the different Individuals unto whom the Quays will belong, which they should be obliged to do, according to a prescribed and regular Plan.

For erecting a new Bridge, including the Houses to be purchased, and also propose to make use of Part of the Materials of the old Bridge	£. 332,000 — —
To building Quays or driving Piles for forming the Embankment, &c.	70,000 — —
To deepening the River, &c.	59,400 — —
Total	£. 461,400 — —

I am, Gentlemen,

Your very humble Servant,

R. Dodd.

35, Whitehall,
London, May 1799.

Gentlemen,

Gentlemen,

IN consequence of your Letter of the 18th April, expressing your Wish to receive any Plan for a new London Bridge, I might think proper to communicate, and your Letter of the 26th Instant following, requesting the Estimate of the Bridge to be made at Three Altitudes, viz. the Centre Arch at 80 Feet, 70, and 60 Feet; I have the Honour to send the accompanying Design, (see Plan, N^o III.)

Appendix.
Plate III.

It represents a Stone Bridge of Five Arches, 920 Feet between the Abutments. Its Measure being taken from High Water Line is 90 Feet in Altitude from its Middle to the Top of the Bridge, and 40 Feet wide, its Centre Arch 160 Feet Span, and 80 Feet high, the Two next being on each Side of it 75 Feet high, and 140 Feet Span. The two others each 120 Feet Span and 70 Feet high. It occupies in the River 210 Feet by the Starlings, and leaving 840 Feet for Water Way, (See Plan N^o IV.) which would admit the Water to flow through very placidly, and without any visible Fall. The Ascent on to this Bridge by gradual Incline of Plane, is Two and Two-fifth Inches in the Yard commencing on the South Side a little beyond St. Thomas Street, and on the North Side at Eastcheap. I should propose this Bridge to be built about 40 Yards above the present, at which Distance an excellent Situation presents itself for the Purpose, passing close on the East Side of Fishmongers Hall on the North Shore, and near Pepper Alley on the South Shore.

Plate III.

It will be necessary to take down some Houses on each Side of the Water, chiefly old and of small Value, to open the Avenue to the Bridge, which should be large and spacious, in order to avoid the present Confusion and Delay occasioned by the Narrowness of Fish Street Hill, (see Plan, N^o VI.)

Plate V.

Proposing the Bridge to combine both Usefulness and National Grandeur, I have superbly decorated it with Columns, Niches, Trophies, Statues, and other Ornaments, as being more consistent with the Dignity and Consequence of the first Commercial City in the World, and the Metropolis of this Kingdom. On a Pedestal, over the great Centre Arch, is placed the Statue of Neptune, the other accompanying Pedestals bearing those of British Admirals and Naval Heroes, as standing over the Element on which their Services have been so very conspicuous and honourable to the Country; and for this Purpose no Place perhaps is more eligible, being the high Road from Dover, and this the Bridge over which most Foreigners coming from thence will pass, is a Situation well calculated to display those courageous Characters, the brave Defenders of our Country. From this Eminence of 80 Feet high will be seen a most extensive View of the City of London and its Environs, the noble Spectacle of the Thames thronged with Boats, Men, and Shipping, the Exit and Transit of numerous Trains of Passengers and Carriages passing over the Bridge, and under, the gallant Ship sailing, will be such
a Scene

a Scene as cannot but excite his Admiration, and command his Respect, and convey to him the most exalted Idea of our Trade, both by Land and Water, and strongly impress them with the Idea of the Wealth, Bravery, and commercial Importance of the British Empire.

Appendix.
Plate VI.

From the Survey I took of the present Bridge last Year, I found many of its Arches in a very decayed State, in some Places the Stones were wanting, in others they were near tumbling out, one of them (see Plan, N° VII.) in particular, is rent by Two very dangerous Fissures; indeed, this Arch is so very bad, as to render it necessary to bind one Stone to the other by large Iron and Lead Clamps, and, in general, the Piers and Starlings are far from being in substantial Condition to keep the Bridge on its Legs; they must as they are, be always building, and yet the Foundation appears to be daily undermining by the Force of the agitated Water, rushing with a great Impetuosity through its confined Arches. To instance this in some of the Centre Arches, you have Two Feet Water, and immediately below the Bridge you fall into Thirty Feet Water. In short, the wretched Fabric is held together at a great Expence (above £. 4,000. per Annum) which, if left to itself for Two Winters, would inevitably tumble into Ruins.

Plate VII.

Many Persons, for want of Information, assert that any Measure that would admit more Water through the Bridge would injure the Navigation above, by its running off too early, and leaving the Country nearly destitute till the next returning Flood. I before gave my Opinion to the Honourable Committee on this Point, and am happy since to find it corroborated by the Evidence called in: I repeat the Substance of it, “that it is an invariable Law in Nature, that whatever tends to give a River a great Influx on a Flood Tide will be the sure Cause of giving it a greater and longer Reflux on an Ebb Tide; this is demonstrated by sometimes a great Quantity of Water near the Height of Two Feet, being prevented passing the Bridge, and entering up the Country, which would be of the greatest Utility to the Upland Navigation; but how is it possible for all the Water which Nature has provided, to pass London Bridge whilst the Starlings act as a Prevention?” (see Plan, N° VIII.)

The dreadful Fall of Water at the present Bridge has, and is still likely to be the Source of many Misfortunes; the Delay it has occasioned to Commerce, by the Impracticability of passing it the Three last Hours out of the Ebb of Seven Hours, is very great, as the Number of Barges sunk, and the Amount of valuable Property lost, and, above all, the Mischief it has done, by bringing many valuable Members of Society to untimely terminate their Existence, is truly distressing to Humanity; all this shews the absolute Necessity of a Remedy; and that must be a New Bridge, which should be built upon such a Construction as to occasion no Fall of Water; and here I am happy to observe, the one I have the Honour to propose, will admit the Water to flow through it in the most placid Manner possible, occupying much less of the River with Piers or Starlings than either Blackfriars or Westminster Bridges. Another Advantage

rage it possesses, is admitting small Shipping to pass through several of its Arches with their Topmasts standing, and larger with their's struck, and occupy the Space between Blackfriars and London Bridge, where I doubt not many Vessels, such as Coasters and Colliers, would come and lay there, as there is sufficient Water in many Places for them at present without Excavation.

GENERAL ESTIMATES.

The Expenses of building the Bridge according to my Design, the Radius of the Centre Arch being Eighty Feet, will be £.350,000, including the Purchase of Houses, building the vaulted Arches, and making the Avenues to the Bridge, &c.

If the Centre Arch is Seventy Feet high, the Expence will be £.332,000, if Sixty Feet £. 314,000.—Incline of Planes to pass over the Bridge: If the Radius of the Centre Arch be Eighty Feet, and the Hypothenuse 400 Yards, the Ascent in each lineal Yard will be 2 and $\frac{2}{3}$ Inches; but if the Semi-diameter of the Middle Arch be Seventy Feet, and the Hypothenuse as before, namely 400 Yards, then the Rise in each Yard will be 2 and $\frac{1}{10}$ Inches, and if the above Arch be Sixty Feet, the Ascent will be 1 and $\frac{4}{5}$ Inches in the Yard.

I mean the present Bridge to remain till the Completion of the New One, which, if built with Stone, I apprehend may be executed in Five Years, and Part of the Materials of the old Bridge, such as the best Ashlers, Balustrades, &c. used in its Construction; as a temporary Support of Timber would answer their Places until it is completed; the Remainder of the Materials I recommend to be employed in building Fire Proof Warehouses on each Shore, from the Butments of the present Bridge, as represented in the Drawings, (see the Plans, N^o I. III. and IV.)

Apper dix.
Plates II. III.
and IV.

Should an Iron Bridge be determined upon in preference to a Stone one, from the smallness of the Time and Expence for its Execution, I would recommend One of Three Arches, nearly similar in Make and Figure, to the Centre Arch of a Design I had the Honour to lay before the Committee last Year, (see Plan, N^o I.) which was, as supposing the present Bridge capable of bearing an additional Superstructure. Although such a Bridge would have a light, airy, and magnificent Effect, yet, on Account of the Shortness of the Durability, when compared with Stone, and for many other Reasons, it is by no Means equal to a Stone Bridge; and as I conceive a small Toll from the Vessels passing through it, with the present Bridge House Estates, would be more than competent to pay the Interest of the Expenditure for its Erection, as such I hope a Stone Bridge will be preferred.

Plate II.

P. 3. There is one Thing I have omitted to mention in my last Report, which is, that a faithful Section of the River's Bottom ought to be taken, with Boring both above and below the proposed Bridge, in order to ascertain the Strata, &c.; a Section of this Sort is absolutely necessary, and will be of the greatest Utility to this Honourable Committee; it will lead them to judge what Sort of a Bridge it will bear, whether a light or maffy one; upon the Foundation being good or not, depends a considerable Part of the Expense of building the Bridge. These Sections and Borings should be taken with the greatest Judgment and Circumspection, and should be performed by Persons who have had Experience in such like Concerns. If the Honourable Committee wish for such Information, the Use of my Boring Rods, &c. are at their Service, and I would myself superintend their Operations, and see they are performed in a proper Manner. I have inclosed for your Inspection a Section of the Borings of one of our deepest Coal Collieries in the North, in order to give you some Idea how those Sections I recommend should be made; the Return of which Section I should esteem a Favour.

I am, Gentlemen,

Your very humble Servant,

R. Dodd.

35, Whitehall,
8th July, 1800.

Appendix, B. 2.

A SCHEME OR OUTLINE of a PLAN for a new Bridge, adapted to the Situation and Circumstances of London Bridge; and the present State of the Navigation of the River Thames, &c. :

And also for the new modelling and Improvement of the Scite and Situation, on which the whole Business of the Port of London is transacted, at the Custom House, Legal Quays, Streets adjoining, &c. :

And also for the Purpose of altering the Streets, Ways, and Avenues leading to each of these Two great Objects, without the Business of the one interfering with that of the other; and without laying Waste (at least as little as possible) private Property, and the present Arrangement of public Buildings, which happen to be contiguous thereto. In order, that the great End (so much of late the Object of the Public) of these Branches of Improvement for the *Port of London*, may be fully obtained.

ON THE FIRST HEAD.

IT is proposed, That the new Bridge shall be contracted to the Length of 800 Feet, for no more is useful; the North End being Landlocked, and little serviceable :

That the Bridge shall consist of Five Arches only, the middle one 150 Feet wide, and 60 Feet high in the Void, above High Water, Spring Tides; that is, 76 Feet above Low Water, with a Depth of Water therein (maintainable) of 15 Feet, which will admit all Vessels in the Coasting Trade, and others of their Draft of Water :

That the whole Water Way shall, at the least, be 700 Feet of good and sufficient Depth, useful throughout, for the free Passage of the Tide as well as Navigation :

That the Passage over the Bridge shall be 50 Feet, clear of strong Parapets; and the Whole of a Strength, Solidity, and Firmness, so as to possess, as well as exhibit, a Character fit alone for the Hazard and Dangers of THE PLACE; and bear the Approach of Shipping, and all the complicated Movements thereof, where raging Tides, Land Floods, floating Ice, and violent Tempests, are at Times to be expected, sometimes in a combined State :

That the present Bridge shall serve (with Alterations for the Purpose) as a temporary Bridge for the Use of the Public, and the more ready Execution of the Works :

That

That the new Bridge shall be placed across the River, to the Westward of the present, so as by a certain Position a straight Line shall pass through the Middle of its Breadth, and also through the Middle of the *Monument*. And, if a circular Opening or Piazza is formed at the South End of the Bridge, the intended *Naval Column* may be constructed therein, to record the Glories of its Object, in a *Scene of Commerce*; which the national Character has created, protects, and, under Providence, will perpetuate:

The Two Establishments for the separate Service of Water Works to the City and the Borough, are supposed to be provided amply by Means of the better, more useful, and manageable Powers of *Watt's* Fire Engines:

And, that the Mains and forcing Pipes thereof, on the London Side, shall be removed into a Side Street, for *that* among other Purposes; with Yards, and more roomy Accommodation than exists at present.

ON THE SECOND HEAD.

IT is proposed, That the well-known Extent of Buildings and Grounds, appropriated at present to the Trade and Commerce of the Port of London, in Length from London Bridge to the low Buildings at the Entrance into the Tower, and in Breadth from the River to Thames Street, shall be divested of all private Buildings, public Conveniencies, and every other Matter and Thing which is not immediately useful and necessary to the sole and great Purpose aforesaid:

That the Establishment of *Billingsgate*, and its various Purposes, shall be removed next to the Entrance into the Tower; with one End of the Dock fronting to Tower Hill, and a greater Width given to it. At that Place, the advanced Post of Yards, Guard Rooms, Sutling Houses, and Menagerie may be set backward, or otherwise provided for:

That all the private Houses, Shops, Public Houses, &c. &c. within the *Extent* aforesaid, shall be purchased and removed:

That the present Building of the *Custom House*, and all its attendant Offices, shall be pulled down in due Time, and re-constructed on a new Scite at the End of the new Bridge, with the Back Front thereof to the Legal Quays, the South End to the River, the principal Front of Entrance to a Square at the Bridge Foot, like Chatham Place in Idea, though not in Form:

That Lower Thames Street shall be, in the whole Length of it, widened into a regular Form of 100 Feet, and the Purchases for that Purpose to be wholly on the North Side; where, if the Front Houses are once acquired,

acquired, the worn-out Houses behind will be found of little Value. Of this 100 Feet, 30 should be assigned to the Use of the Legal Quays alone, with a Parapet and high Iron Railing, dividing the Two Breadths completely; the other for the Passage of all Carriages, &c. from London Bridge to Tower Hill freely; and through Iron Gates, in the said Railing, corresponding to the several Passage Ways, made or to be made, to the Legal Quays. These Gates to be locked in the Night Time, and kept shut, under proper Officers, at other Times, save and except for the Purpose of carrying Goods away from the Warehouses:

That the River should be embanked all along the said Extent very little at the West End, but much at the lower End, corresponding thereby to the Front of Tower Wharf, and to procure the Advantage of a deeper Water. The Hills and Shoals in Front thereof, being done away by the Removal, &c. of the present Bridge, Vessels of large Draft of Water may, with Safety in that Case, approach these new constructed Quays, the most useful Form whereof would require a separate Discussion.

ON THE THIRD AND LAST HEAD.

IT is proposed, That nothing shall be done to improve the Eight several Ways and Streets, which now lead from different Points in Lower Thames Street, up Hill, into Tower Street and Little Eastcheap. The Money to be laid out, on any Plan of Improvement, by widening or otherwise, would be enormous in proportion to the Good obtained; and the Ascent of the Hills would still remain:

That a free Passage Way should be obtained out of the Area of Tower Hill, in so complete a Manner that all Carts with Goods, passing from the Legal Quays, should go *Eastward* from Harp Lane to the said Passage Way; and turning from thence along Tower Street, &c. &c. into the middle Parts of the City: And also, that there should be established a Stand for Carts waiting for Hire, on the Side of the Passage Way, for the Eastern Half of the Legal Quays, and for Billingsgate above mentioned; none being to be allowed in Thames Street:

That the narrow Street of Little Eastcheap, should be widened on the South Side, so as to form a straight Line from the South Side of Tower Street as far as Pudding Lane, leaving thereby a Church standing in the Middle of it, and a Space for a Coach-Stand, &c. The West End of this Street being widened, to make it useful from End to End, by a Proposition hereafter mentioned.

That the Churches of Saint Magnus and of Saint Bennet should be pulled down, and the Parishes consolidated into one; in the same Manner as were done with several immediately after the great Fire, and rebuilding
O of

of the City. These Churches, and a small Church Yard between Fish Street Hill and Pudding Lane, being removed out of this Field of Difficulties, it would not cost much to construct with the old Materials a new and larger Church, in part of the open Space, to be obtained by widening Eastcheap above-mentioned; the more especially, as the Parish of *Saint Magnus* is now of small Extent, and the Church uselessly too large.

These Things being premised, it is proposed, as the last and principal Part of the Business, That there shall be established a Square of considerable Size round the present Monument; and that so much of the East Side of Fish Street Hill and of Gracechurch Street, as extends from the Monument to Fenchurch Street, should be all pulled down, and widened to 100 Feet; having by that Means the *Monument* in the middle Line thereof, Northward, as well as in the Middle Line of the new Bridge, Southward; mentioned in the first Part of this general Scheme, submitted for substantial Utility.

It is proposed, That the said Square shall be level, and answerable to the proper Plinth of the Monument, that it may appear, as it ought to do, to stand on level Ground.

From thence to the Foot of the new Bridge, and to the upper Part of the Centre Arch thereof, as hereinbefore stated, there will be an Acclivity or Rise (*a*) *proper for Carriages*, &c. and appropriated only for passing the River, and getting to the front Entrance of the *Custom House*:

From the Square of the *Monument*, a Street to be established partly on Arches 80 Feet wide, and also over a Street or Archway, which is to give as free a Communication between Upper and Lower Thames Street, as if no such Arch was there:

That from Thames Street to the End of the Bridge, there shall be an open Square of 120 Feet in Width, and about 260 Feet in Length, corresponding at the South End to the Fronts of the new Wharfs; on the East Side of which there shall be erected the new *Custom House*, insulated all round; with a Way on the East Side of it leading from the new Quays to Thames Street, without going under the Warehouses in great Part:

This *Custom House* will be considerable in Height from the Level of the Wharfs up to the Level of the Bridge; and in that Space, there may

(a) By *proper for Carriages*, &c. is meant Ten Inches rise to a Horizon of Fourteen Feet long:

At the South End of London Bridge, opposite to Tooley Street, it is at present at the Rate of Eight Inches and a Half; and on the End of the Butment Arch, it is Nine Inches. At the North End of Blackfriars Bridge, it is at the Rate of Eight Inches, and Eight and a Half.

On Holborn Hill it is, opposite to Shoe Lane, at the Rate of Ten Inches and a Half; and opposite Ely Place Ten Inches.

be (internally) separate Staircases, Offices, and Warehouses, for its immediate Use and Communication between the principal Parts above the Quays, and Bridge Street. All this may be done with Ease if Saint Magnus Church was removed. The present Custom House requires to be rebuilt at all Events, on Account of the Want of proper Connection between the several Offices; and, above all, on Account of its Situation among Carts, Confusion, and Carriages, which have no Room to turn, load, and do their Business, free and clear of that of the Custom House itself.

It is proposed also, That there shall be on each Side of the main Street, leading from the Monument to the Bridge Foot above-mentioned, a Side Street of 60 Feet Width, leading down from Monument Square, one into Lower Thames Street and the Legal Quays, and the other into Upper Thames Street; and *this* solely for the Purpose, that all the Trade and Concourse arising from the Wharfs, above as well as below Bridge, may not interfere with one another, or with the Passage over the Bridge, until the Whole meet at the Monument Square; which, to accommodate such an Object, may be 200 Feet from East to West, or more if necessary.

Other Connections and Accommodations may be stated, but this Paper has got to too great a Length already. On the West Side of the Square next the Bridge, another Building may be erected by the *City of London*, for any or several of its public Purposes, provided the outer Shell of the Building is made to correspond in all Respects to the new Custom House.

With respect to the Termination on the Surrey Shore, there is no Figure which will suit so well as a very large Place of circular or elliptical Outline; because the Lines and Angles formed by Tooley Street, High Street, and the Bridge, accord so very ill together.

A Drawing would be necessary to convey a proper Idea (*b*); and indeed more accurate Measurements, &c. than those published, are absolutely necessary, before the Merit of a Design can appear with full Force and Conviction.

(*b*) The Idea, however, is to widen the Street from the Bridge, on the West Side *only*, all the Way to the Sessions House at St. Margaret's Hill; and to make the Street point South West at first, from the circular Area, to pass free of Saint Saviour's Church, and be 120 Feet in Width for that Length. This will give more Extent of Base Line, and running upon a higher Level, would admit of a Part of that Width for a separate Street to the present Houses on the East Side, until the same should be rebuilt, when worn out. By the Bridge being removed farther West, and more distant from the End of Tooley Street, great Part of the Height would be attained thereby on that Side. But it is possible to make a better Road, &c. into Kent, by forming a new Line (like Blackfriars Street and Road, on the Surrey Side) from the Foot of London Bridge in a straight Line (to the Eastward of Saint Thomas and Guy Hospitals) to the Meeting of the Four Roads at Kent Street End. *That*, being new, might be made on a higher and proper Level; it would not cost much. But it is more to be desired than expected; although it may be truly said, it would answer many beneficial Purposes, besides answering an elevated Bridge. They are so great and obvious, it is useless to enumerate them.

To

To return to the London Side; the last Thing to be said is, that the Proposition need not be carried further; but yet it may be mentioned with Propriety, that what is stated is laid with an Eye to the Continuation of the 100 Feet Street, Northward, from Fenchurch Street to Leadenhall Street. The East Side of that Length bends Eastwards, and may be widened with Ease.

This established, there would be Nine distinct Streets terminating at different Points, on a principal one leading to the North End of London New Bridge, without any one interfering with the other; for, a wide Street clears all the Incumbrances and little Intricacies arising from narrow ones, ending in a principal, too narrow for its own Purposes, as the Case is now, from the crossing at Cornhill, to that of the two Thames Streets.

Robert Mylne.

23d June 1800.

Appendix, (B. 3.)

ESTIMATES and OBSERVATIONS by Messrs. TELFORD and DOUGLASS.

THE following Estimates and Observations having been furnished by us, in order to explain the various Drawings which we have, from Time to Time, had the Honour of laying before the Select Committee, for improving the Port of London, it may be proper to state, that the Calculations of the Iron Work for the Arch, and the Piles, Platforms, and Masonry for the Pier, were made from the Plan referred to, under the Title of N^o 1. The other Statements are founded upon these Calculations, and were made to shew the Committee the comparative Expenses of the several Plans, with their various Appendages; they are understood and admitted to be very general; and with Regard to the Property to be affected, the Valuations are made, without having an Opportunity of going minutely and correctly into their Situation and Extent; but if in making the Purchases more Capital may, in the first Instance, be required than has here been stated, the Value of the adjoining Property will, upon the Whole, be so much improved by the proposed Plans, that, in the End, the Expenses may probably rather be diminished than increased.

When the Plans have been finally arranged, as to the Wharfs, Bridge, Inclined Planes, and Avenues; and the Situation, Nature, and Extent of the Properties, have been once ascertained; correct Estimates and Valuations may then be made out, and the relative Advantages of each Part of the Plan, stated in a clear, concise, and satisfactory Manner.

We have, in the mean Time, made every possible Exertion, in order to render the following Calculations, Valuations, and Statements, as satisfactory as the present Circumstances would admit of.

It was not thought necessary to insert, in this Appendix, the Plan mentioned in the 6th Line above, "under the Title of N^o 1."

P

ESTIMATE

ESTIMATE of One Arch of 165 Feet Span, and 65 Feet Rise, with the Piles, Platforms, and Masonry to the Pier; and with the Spandrels, covering Plates, Railing, and Roadway for the above Length; according to the Plan expressed, N^o 1.

23,328	Cubic Feet of Elm in the Piles and Platforms of One Pier	- - - -	at 3s.	£.	s.	
				3,496	4	
96 375	Cubic Feet of Masonry	- - - -	4s.	19,375	—	
536	Tons of Iron	- - - -	£. 17	9,112	—	
2,040	Superficial Feet of Paving to Footpaths	- - - -	2s.	204	—	
622	D ^o Yards of making Ground upon Plates and Paving Driving Way	- - - -	5s.	155	10	
					32,342	14
Take Six Times this Sum for the whole Bridge, exclusive of the Abutments, which considering that this Arch has been taken 20 Feet above the Average Span; and as the River Piers are more expensive than the Work on the Shore, this seems sufficient Allowance; therefore multiply by - - - - -						6
					194,056	4
Allow further for finishing the Two Abutments beyond the Arches - - - - -					10,000	—
Total Expence of Bridge, N ^o 1. - - - -					£.	204,056 4

ESTIMATE of WHARFS between the Bridges.

1,485	Yards in Length, being the Distance between the Bridges	- - - -	at per Yard	£.	s.	
				185,747	15	
	D ^o South Side	- - - -		185,747	15	
Total Expence of Wharfs, on each Side the River, between the Bridges					£.	371,495 10
N. B.—The Back of the Wharfs proposed to be filled up with the Matter excavated from the Bed of the River.						

SUNDRY WORKS.

Dimensions.	Contents.	
L. 1,485		
B. 250	111,375 Cubic Yards, excavated from the Bed of the River, so as to make the Whole, between the Bridges, 15 Feet in Depth of Water at Low Water Mark	£.
D. 3		55,687

LONDON WATER WORKS.

Mr. Beighton, who has described the Structure and Operation of these Works (in the Philosophical Transactions, A. 61. Vol. VI. p. 358.) has calculated the Quantity of Water raised by them in a given Time: And states the same to be 123,120 Ale Gallons; supposing there were no Imperfections or Loss. But he infers, from Experiments performed on Engines whose Parts were large and excellently constructed, that they will lose from $\frac{1}{5}$ to $\frac{1}{4}$ of the calculated Quantity - - - - - divide by 5

Ale Gallons.
123,120

Therefore will suppose the London Water Works lose only $\frac{1}{5}$ of the calculated Quantity - - - - -

24,624

Which leaves to be raised in One Hour - - - - -

98,496

To the Height, as he also states, of 120 Feet, which must be the extreme Height.

To provide for affording this Supply, we calculate for Two Steam Engines of 40 Inch Cylinders, 16 Inch Pumps, to work with a Six Foot Stroke, and to make 16 Strokes per Minute. The Expence of these, and connecting them with the Works - - - - -

£.

10,000

Also a spare Engine, in case of Accidents - - - - -

3,000

13,000

To Expence for maintaining those beyond Water Wheels - - - - -

12,000

25,000

Allow for Surrey Side—Two-thirds - - - - -

16,666

£. 41,666

EXPENSE TO Gates to the Entrance to the Wharfs, securing the Passages under the Bridges, &c. - - - - -

£.

20,000

Temporary Bridge - - - - -

£.

7,200

Allow for Avenues - - - - -

2,800

£. 10,000

N. B.—The Timber employed, to be converted into Defenders for the Wharfs.

N. B.—The Materials of the present Bridge to be applied to the rebuilding the new Bridge and Wharfs, as far as they are suitable: And the Difference of Value above the Expense of taking down and clearing away, to answer for the making Caissons for the Piers, and for unforeseen incidental Expenses.

SPACE of WHARFAGE gained from the River, as per PLAN.

Feet.	Supl Feet.						
L. 1,800							
B. 100							
—	180,000	Space gained between the Bridges North Side					
1,400							
60							
—	84,000	D°	-	-	D°	-	D°
600							
80							
—	48,000	D°	-	-	D°	-	D°
9)312,000	Which is the Total Space gained on the North Side, equal to					-	Square Yards.
						-	34,666
1,800							
80							
—	144,000	Space gained between the Bridges South Side					
2,000							
60							
—	120,000	D°	-	-	D°	-	D°
9)264,000	Total Space	-	-	-	-	D°	29,333
Total Space gained between the Bridges Upwards of 13 Acres.							Square Yards.
							63,999

SPACE in the POOL, between the Bridges, as per PLAN.

	Feet.	
L.	4,000	
W.	664	
—		Sq. Yards.
9)2,656,000	295,111	Equal to about 61 Acres.

Additional EXPENSE, if carried above Blackfriars Bridge, as per PLAN.

120 Yards in Length of Wharf Wall, &c. South Side, at £. 120.	£. 14,400	
80 D° - D° - - - North Side, at £. 120.	9,600	£. 24,000

SPACE gained above Blackfriars Bridge, South Side.

$\begin{array}{r} 340 \\ 60 \\ \hline 20,400 \\ 210 \\ 50 \\ \hline 10,600 \end{array}$

9)31,000 Which is equal to

Square Yards.
 3,444

WHARFS below the Bridge.

1,500 Yards of Wharfage from the Bridge to the Tower, at £.130. 195,000
 220 Yards - - - South Side - - - £.130. 28,000

Total Expense - - - £. 223,000

$\begin{array}{r} 1,450 \\ 20 \\ \hline \end{array}$

29,000 Space gained between the Bridge and the
 Tower - - - - -
 D° below the Bridge, South Side - - -

Sq. Yards.

29,000

4,400

Total gained - - -

Square Yards.
 33,400

PARTICULARS OF HOUSES, &c.

Bridge, according to PLAN, N° I.

N° 10 Houses, Fish Street Hill £.80. a Year, 30 Years
 Purchase.

30

2,400

10 Houses.

Affected $\frac{1}{2}$ Value - 24,000 - - - 12,000

60 Yards.

60

120

120

240 N° 30 Houses, Borough Side, £.50. a Year, 30 Years
 Purchase.

30

1,500

30

Affected $\frac{1}{2}$ Value 45,000 - - - 11,250

£.
 23,250

If the large Arch is placed in the Middle of the River, as per
PLAN, N° 2.

				£.
N° 10 Houses, Fish Street Hill - - - -				12,000
150	}	High		
150		Street.		
100	}	Tooley		
100		Street.		
8)500	62 Houses, Borough Side, £. 50. a Year, 30 Years			
	Purchase.			
				30
				1,500
				62
	Affected $\frac{1}{2}$ Value - 93,000 - - -			23,250
				£.
				35,250

If the Bridge is placed opposite the West End of St. Saviour's Church,
as per PLAN, N° 3.

N° 10 Houses, Dyer's Hall to Thames Street, £. 50. a Year,				£.
30 Years Purchase - - - -				15,000
6 D° along the North Shore £. 50. a Year, 30 Years				
Purchase.				
				30
				1,500
				6
If taken away - - - -				9,000
				£.
				24,000

9 Houses, Borough, near High Street, £. 40. a Year, 20
Years Purchase.

				£.
				20
				800
				9
Affected $\frac{1}{2}$ Value - - - -				7,200
				£.
				3,600
8 Houses opposite the Market, £. 30. a Year, 20 Years				
Purchase.				
				20
				600
				8
Taken away - - - -				4,800
				£.
Carried forward - - -				8,400

	Brought forward	-	£.	8,400
10 Houses opposite Church Yard, £. 20. a Year, 20 Years Purchase	20	-		
	400	-		
	10	-		
Injured $\frac{1}{2}$ Value	4,000	-	-	2,000
10 Houses, from Church to River, £. 20. a Year, 20 Years Purchase.	20	-		
	400	-		
	10	-		
Injured $\frac{1}{2}$ Value	4,000	-	-	2,000
10 Houses opening to Tooley Street, £. 30. a Year, 20 Years Purchase	-	-	-	6,000
				£.
				18,400

STATEMENT AS TO THE WHARFS.

WHARFS between the Bridges.

34,666 Square Yards gained North Side	-	at 20s.	£.	34,666	s.	10
29,333 Square Yards gained South Side	-	10s.	£.	14,666	s.	10
Annual Rent	-	-	£.	49,333	-	-
If sold at 20 Years Purchase	-	-	£.	20	-	-
Total Value	-	-	£.	986,660	-	above 10 per Cent.

EXPENSE.

Wharfs North Side	-	-	-	£.	185,747	s.	15
D ^o South Side	-	-	-	£.	185,747	s.	15
Excavations	-	-	-	£.	55,687	-	-
Gates, &c. to secure Wharfs, and Purchases	-	-	-	£.	42,000	-	-
				£.	469,182		
Value above Expense	-	-	-	£.	517,478		

WHARFS from the Bridge to the Tower.

33,400 Square Yards North and South Sides	-	at 20s.	£.	33,400
If sold at 20 Years Purchase	-	-	20	
Expense of Wharfs	-	-	£.	668,000
Excavations	-	-	223,000	
			27,000	
				250,000
Value above Expense	-	-	-	£.
				418,000

WHARFS above Blackfriars.

3,444 Square Yards	-	-	-	at 10s.	£.	1,722
If sold at 20 Years Purchase	-	-	-	-	20	
Expense of Wharfs	-	-	-	-	-	34,440
						24,000
Value above Expense	-	-	-	-	-	£.
						10,440
Total Value above Expense	-	-	-	-	-	945,918

STATE of ESTIMATE of the Bridge, according to the finished PLAN, present Situation, N° 1. Large Arch, nearest North Shore.

Expense of the Bridge, as per Particulars	-	-	-	-	£.	204,056
Temporary Bridge and Avenues	-	-	-	-	10,000	
Water Works	-	-	-	-	41,666	
Purchases, Houses, Fish Street Hill	-	-	-	-	£.	12,000
D° - - - D° Borough Side	-	-	-	-	11,250	
Descent to Tooley Street	-	-	-	-	23,250	
					15,000	
Total Expense	-	-	-	-	£.	293,972

If the large Arch is placed in the Center, as per SKETCH, N° 2.

Bridge	-	-	-	-	£.	204,056
Add for Extra Length South Side	-	-	-	-	32,500	£.
						236,556
Temporary Bridge and Avenues	-	-	-	-	10,000	
Water Works	-	-	-	-	41,666	
Purchases, Fish Street Hill	-	-	-	-	12,000	
D° - - - Borough Side	-	-	-	-	23,250	
Descent to Tooley Street	-	-	-	-	35,250	
					25,000	
Total Expense	-	-	-	-	£.	348,472

PLAN, N° 3. in which the Bridge is placed opposite the West End of St. Saviour's Church, and pointing to the Royal Exchange, with the Inclined Planes connecting the Bridge with the Wharfs and adjoining Streets, as per general Plan, Plate I. and Plates II. III. and IV.

Bridge	-	-	-	-	£.	204,056	
Add for Inclined Plane, North Shore	-	-	-	-	£.	42,500	
							246,556
Water Works	-	-	-	-	-	-	41,666
Purchases, Dyers Hall to Thames Street	-	-	-	-	£.	15,000	
D° along the North Shore	-	-	-	-	£.	9	
							24,000
D° Borough Side	-	-	-	-	-	-	18,400
Inclined Plane to Tooley Street and High Street	-	-	-	-	-	-	30,000
							360,622
Add two Inclined Planes on the West Side, leading to Blackfriars	-	-	-	-	£.	30,000 each	60,000
Dowgate Dock, Purchases 6 Stores, at £. 120. per Annum, £. 720. Twenty Years Purchase	-	-	-	-	-	-	14,400
							£.
Total Expense	-	-	-	-	-	-	435,022

Space gained in the new Pool	-	-	-	-	-	61 Acres.
Allow for each Acre	-	-	-	-	-	5 Ships.
						305 Ships.

ABSTRACT OF TOTAL EXPENSE of the Three PLANS brought forward.

PLAN, N° 1.						
Bridge as per Particulars	-	-	-	-	£.	204,056
Wharfs between the Bridges	-	-	-	-	£.	371,495
Excavations between the Bridges	-	-	-	-	£.	55,687
Removing Water Works and erecting Steam Engines	-	-	-	-	£.	41,666
Gates to Entrances, and securing Passages under the Bridges	-	-	-	-	£.	20,000
Temporary Bridge and Avenues	-	-	-	-	£.	10,000
Additional Expense, if carried above Blackfriars Bridge	-	-	-	-	£.	24,000
Improving the Wharfs from the Bridge to the Tower on both Sides the River	-	-	-	-	£.	223,000
Purchases and Damages, Fish Street Hill	-	-	-	-	£.	12,000
D° - - - D° - Borough Side	-	-	-	-	£.	11,250
Descent to Tooley Street	-	-	-	-	£.	15,000
						£.
Expense of the First Plan	-	-	-	-	-	988,154

Expence of the First Plan, brought over - -		£. 988,154
PLAN, N° 2.		
		£.
If the large Arch is placed in the Center, add extra Length -	32,500	
Difference in Purchases Borough Side - - - - -	11,000	
Difference in Descent - - - - -	10,000	
		53,500
		1,041,654
PLAN, N° 3.		
If the Bridge is placed opposite the West End of Saint Saviour's Church, with the Inclined Planes, leading to Fish Street and Tooley Street, the Expence will be - - - - -		
		1,054,804
N. B.—If the Wharfs below London Bridge and above Blackfriars Bridge, are not included, the Sum of - - - - -		£. 247,000
may be deducted from any of the Three Plans that might be adopted.		

OBSERVATIONS.

THE last of these Three Plans, as far as relates to the Bridge, appears to afford the most complete Accommodation to the Trade, Carriages, and Passengers, between the City and Southwark; and consequently between Middlesex and the opposite Counties, on the South Side of the Thames.

This great Object is obtained by the Addition of the Inclined Planes, or small Land Arches, proposed on each Side of the River, to connect the Access of the Bridge with Fish Street Hill and Tooley Street, which are the Communications with the present Bridge.

To obtain a proper Elevation to admit the Passage of Ships under the Bridge, there must be these Land Arches on each Side, sufficient to produce a regular and easy Ascent: Except by the First Plan, which places the highest Arch nearest the North Shore, and spares most of the Encroachments on the Surrey Side.

One great Advantage and Convenience of these Land Arches and Inclined Planes, will be, that the Passage over the Bridge will not be crowded and interrupted by the Carts, Carriages, and Passengers, who can always pass in Two Directions,

rections, either along the Inclined Planes or straight forwards. These Inclined Planes will scarcely interfere with the Business upon the Wharfs, because the Arches of which they are composed, will admit free Communications to Streets and Warehouses, and even, if found necessary, to Basons and Docks.

In constructing a Bridge for the Metropolis of the British Empire, after giving the Structure every Advantage of Durability and Convenience, it is proper to consider it in the Light of a National Ornament, and if we can include both these Considerations in one magnificent Plan, that Plan will perhaps engage and deserve the most Attention.

None of the City Edifices have any Point from which they can be viewed to Advantage; and it must be obvious, that an oblique View of a Bridge is the most striking.

Now the Access to the Bridge by the Inclined Planes affords this Prospect, while the Bridge, by the last proposed Situation, makes the regular Communication over nearly straight, where it joins in High Street, instead of the crowded and inconvenient Bend to the present London Bridge.

By adopting the Situation and Connections expressed by the Plan, N^o 3, with the Inclined Planes, and by preserving the present Bridge until the new one with the Two Inclined Planes on the East Side are completed, the Communication with Fish Street Hill, and the High Street and Tooley Street in the Borough, would remain uninterrupted, and the Value of Property there would afterwards be much improved, by obtaining an elegant Opening and Connection towards the new Wharfs and the River.

REMARKS on PLAN, N^o 3, which forms the 4th Plan.

Supposing the Bridge to be placed opposite the West End of St. Saviour's Church, with a regular Curve and Inclined Plane leading to Fish Street Hill, on the North Side, and Tooley Street and High Street, on the South Side: The same as proposed in the Ground Plan, N^o 3. Only the Land Arches leading to Thames Street on the North Side, also to the Borough Market on the South Side, to be discontinued; and that the Length of the Bridge across the River should not extend any further in a straight Direction than the new Wharfs on each Side.

The new Bridge on this Plan, would afford every Accommodation of Access between the City and Southwark, that is derived from the present Bridge, and could meet with no Opposition from Individuals, as private Property would not be interfered with. The Ships passing under the Grand Arch of 65 Feet in Height, would be the same as the other, and the Descent of the Bridge will not exceed Two Inches and a Quarter to the Yard in any Part of the Incline of Plane.

The

The Expense would then be as follows :

Bridge, including the Inclined Planes on both Sides of the River	- - - - -	204,056	
Wharfs between the Bridges	- - - - -	371,495	
Excavations between the Bridges	- - - - -	55,687	
Removing Water Works and erecting Steam Engines	- - - - -	41,666	
Gates to Entrances and securing Passages under Bridges	- - - - -	20,000	
Purchases along the North Shore	- - - - -	9,000	
Purchases Borough Side	- - - - -	3,600	
			£.
Additional Expense of Iron, as per Plan, N° 4.	- - - - -		705,504
			7,973
Total Expense	- - - - -		713,477
N. B.—If Two Inclined Planes are added to the West Side of this Bridge, leading to Blackfriars: the Additional Expense will be			
£. 30,000 each	- - - - -		60,000
Total Expense	- - - - -		773,477

ABSTRACTS.

In the Second Report of the Select Committee, in Pages 7 and 8, it is stated, that in the Year 1798 there were in and out :

Foreign Ships	- - -	3,291	
British D°	- - -	2,971	
			Ships.
			6,262

That One Half of the British Ships, and Three Fourths of the Foreign, were under 200 Tons Burthen.

That the Coasters in the Year 1798 amounted to 10,133

Of which 3,289 were Colliers, averaged at - - 228 Tons

That the Imports in 1797 amounted to - 13,065,290

Exports D° - - - 17,721,441

£. 30,786,731

From this Statement we may venture to infer, that as by far the greatest Proportion of the Tonnage and Value is carried in Ships of about 200 Tons Burthen, which could pass under the new Bridge, and unload immediately upon the Wharfs between the Bridges :

And

And as a considerable Proportion of the Goods would be brought in Lighters from the Isle of Dogs to unload at the Wharfs, for Warehouses along the Shore and in the City; that there would be at least One Fourth of the Whole brought into the new Pool, which is nearly £.8,000,000 Value.

And, considering the Saving in the Article of Lighterage, and the Convenience and Safety afforded by the new Wharfs, it could not be a heavy Tax to lay One Penny in the Pound Value upon all Goods brought into the Pool. This would produce an Annual Revenue of £.33,333, which is above 10 per Cent. upon the Expenses incurred by erecting a new Bridge.

The above, if sold at 20 Years Purchase	-	£.	666,660
Total Expense of the Bridge, as per Plan, N ^o 4.	-	£.	212,029
	Value above Expense	-	-
Total Value of Wharfs above what they cost	-	-	£.
			454,631
			945,918
Total Value of the general Plan, executed above Expense	-	-	£.
			1,400,549

Total Expense of the Bridge, and Purchases, Plan, N ^o 3.	-	-	-	£.	435,022
If the Tax upon the Shipping is left out, the Value above Expense will be					510,896

Half the Length of the Bridge, as per Plan	-	-	350 Yards.	
Say Two Inches and $\frac{1}{4}$ to a Yard	-	-	2 $\frac{1}{4}$ Inches.	
Gives in perpendicular Height upwards of	-	-	-	Ft. In.
The High Water Level below the Height of the Wharfs, is nearly equal to the Thickness of Iron on the Top of the Bridge.	-	-	-	65 7

The Center Arch 65 Feet 7 Inches high, leaves the extreme Descent on the Bridge 2 $\frac{1}{4}$ Inches to a Yard.

Half the Length of the Bridge	-	-	-	350 Yards.	
Supposing the Descent to be	-	-	-	2 $\frac{1}{4}$ Inches.	
				12)875	
					Ft. In.
					72 11

The Center Arch 72 Feet 11 Inches high, leaves the extreme Descent on the Bridge $2\frac{1}{2}$ Inches to a Yard.

The Extreme Descent of the Three Stone Bridges taken accurately.

LONDON:

1 Inch and $\frac{1}{4}$ to a Yard.

1 Inch $\frac{1}{2}$ to a Yard.

NORTH END.

BLACKFRIARS:

2 Inches and $\frac{3}{8}$ to a Yard.

2 Inches $\frac{1}{2}$ to a Yard.

SOUTH END.

WESTMINSTER:

3 Inches and $\frac{1}{4}$ to a Yard.

2 Inches $\frac{1}{4}$ to a Yard.

Excepting Ten Yards in Length, Westminster Bridge is $2\frac{1}{4}$ Inches to a Yard on the Extreme.

Taken by J. Douglass, Engineer.

20th June, 1800.

The Width of London Bridge, is

Ft. In.

45 0

The Width of Blackfriars, is

41 0

The Width of Westminster, is

39 9

The Average Descent on Blackfriars Bridge is Seven Eighths of an Inch to a Yard; London and Westminster Bridges will be in the same Proportion to their extreme Descent.

The Average Descent on the new Iron Bridge will be Fifteen Sixteenths of an Inch to a Yard.

Proposed ORNAMENTS to adorn the New Iron Bridge.

AS an Object much preferable to a Naval Pillar, we wish to propose that this new Bridge should be a Chain of Triumphal Arches, to commemorate the Naval Victories of England on their proper Element. The Citizens of London would, perhaps, not be offended if this Bridge was to be named Victory Bridge, and we would propose to place on the One Side of the Bridge over the Center of the Middle Arch, a Statue of our most gracious Sovereign, and on the other Side, also over the Center, a Figure of Victory supporting the Royal Arms of England.

Over the Center of the Two Arches, on each Side of the Middle Arch, we would propose to place Medallions or Busts of the Four Admirals who have distinguished themselves in the great Engagements of the present War, with appropriate Trophies.

On the Center of the Arches next the Shore we would propose to place the Arms of the Royal Admiral His Highness the Duke of Clarence, the Admiralty Arms, the Arms of the City of London, and those of the principal Secretary of State. And we would propose to ornament the Stone Butments of the Bridge near the Water, with the Heads of those Ships on board of which these distinguished Admirals earned the Laurels of Victory.

Why should not this magnificent Work be made a national Trophy, to commemorate those Naval Victories which adorn the British Annals of the present Time? Where could it be placed with so much Propriety as in the Center of the British Metropolis, and over the River which conveys the Trade of the World into the Heart of the Empire; over that River which has been the Nursery of those gallant Seamen who fought the ever memorable Battles of their Country?

This Structure, so adorned, would present to the View of our young Seamen, destined in future to emulate the Glory of their Predecessors, a most honourable and durable Token of the Regard of their Country. It would keep alive in the Minds of our Citizens those great Events which have placed the Naval Power of this Country on so solid and extensive a Basis: It would remind those Citizens how much they owe to those Exertions; and it would be the Means of teaching the Inhabitants of the Empire, who may resort to the Metropolis, the warm Support which it is their Duty to lend the Government in their steady Exertions to maintain this sacred Bulwark of the British Empire. It would do every Thing that is proposed by the Naval Pillar, and that in a Manner worthy the Taste of a powerful, warlike, and trading People, who cultivate and admire the Fine Arts.

If it is admitted that these desirable Effects might be produced by this Plan, it seems also evident that no serious Evils are to be apprehended which can counter-balance them: It certainly would be no Reproach to the national Taste. Tri-
umphant

umphal Arches have been erected on many Occasions, but none ever at once so magnificent, appropriate, and useful, as this one would be. London Bridge was formerly said to be built on Packs of Wool; let this new one be founded on the Ships which bore those Naval Commanders, and their Bows might adorn the Basis of each Pier; for we must admit that the Spirit and Ability to execute so magnificent a Work in the Midst of the Expenses of a long War, arises in a great Measure from the Exertions of those brave, able, and distinguished Men.

The Necessity of making NEW WHARFS.

1st. The Bed of the River must be excavated 15 Feet in Depth at Low Water, to float Ships of 200 Tons.

2d. The filling up the Wharfs behind the Stone Work, will be the most convenient Deposit for the excavated Soil.

3d. The Average Width of the new Wharfs on each Side the River will be about 30 Yards, which Space at present is nearly left dry at Low Water; and consequently converting it into Wharfs would save all the Expense in excavating that Surface.

4th. If we deepen the Bed of the River to float Ships of 200 Tons, as above, we must also contract in the same Proportion to regulate the Velocity of the Tide, and preserve the Depth of the River, by which Means the Velocity would nearly be preserved at its present Rate.

5th. Between the Bridges at present there are few or no Wharfs, particularly on the Surrey Side; therefore the Proprietor's Interest chiefly depends on Warehouses not on Wharfs: from this we may observe sufficient Encouragement for them to improve and build Warehouses for the Reception of Goods from the New Wharfs, without expecting any other Interest, as the Value of their Property would be so much enhanced from the increased Trade.

6th. The principal Advantages of the General Plan depends on erecting the new Wharfs, which, if sold at 20 Years Purchase, would give £. 945,918 more than their first Cost.

7th. The Ships would be brought alongside of these Wharfs, and their Cargoes be loaded or discharged immediately into the Warehouses or Stores, or in any other Way which best suits the Interest of the Merchants and the Revenue, and from which Mode much Ease and Expedition would be obtained.

In order effectually to prevent Pilferage, which is the leading Object in the Improvement of the Navigation and Commerce of the Port, we propose that all the Water Arches of the Iron Bridge, excepting the principal Arch, shall be secured, during the Night, by Means of Chains, which shall prevent Boats or Barges, or any other Craft, passing at improper Hours; these Chains shall be regulated by the

Rife

Rise and Fall of the Tide, and be raised or lowered every Morning by manual Labour, or other Power. The principal Arch will be left quite open for a Passage Night and Day; but to prevent suspicious Boats or small Craft from passing through this Arch to reach the Shipping, we also propose that a Watch-house be constructed in each Spandrel of the Arch, where armed Centinels shall be placed, and also Boats with small Guns upon them, so as to enable them to command this Passage.

The Communication with the Wharfs from the Town may be effectually prevented by fixing Gates at the End of each Street, and likewise where the Wharfs terminate at the Bridges, and which by being shut at Night, will prevent all Communication with the Wharfs, excepting the Proprietors or Wharf-holders. Revenue Officers might also be stationed on the Wharfs.

The Plan here proposed would be the Means of preventing pilfering from below London Bridge, and also from each Shore between the Bridges, from whence it is understood that these Depredations are principally carried on. Blackfriars Bridge, it is true, is still left open; and therefore, in order to prevent any suspicious Boats or small Craft from passing down the River at Night, it is proposed that Two armed Centinels shall be placed at each End of the Bridge, on the upper Side, and Two others shall be stationed in floating Batteries behind Two of the middle Piers, having Two small Boats; and these Centinels, so placed and armed, would effectually command the River at this Place.

Tho^r Telford, Surveyor.

Jas^r Douglass, Engineer.

DEPOSIT and PUBLIC MARKET for COALS.

THE Importance of a regular Supply of Coals to the Metropolis, has led me to think of an Arrangement which might tend to facilitate it; and submit the following Plans and Observations.

My Plan consists of Six Depôts, under the Surface of the new proposed Wharfs, or Embankments; Two on the South Side of the River, as seen in the general Ground Plan, between the new Bridge and Blackfriars; and Two more nearly opposite on the City Side, between the Bridges; the remaining Two between the new Bridge and Wapping.

The Front of each Depôt to the River to be 300 Feet in Length, with Three Hatchways, allowing Room for unloading Three Ships at one Time; and each Depôt 80 Feet in Width, by 16 Feet in Depth. Which Six Depôts will contain 38,400 Chaldrons, which leaves a Surplus of 23,000 Chaldrons more than the Weekly Consumption of London. These Stores should be made like Cellars

under the Streets, and firmly planked or arched above, and made Watertight, to preserve the Coals in a dry State, which will be of the utmost Importance in Point of Dispatch. The Coal Ships could be laid so close to these Wharfs, as to admit of their Cargoes being delivered immediately through the Hatchways into the Stores; by which Means the Lighterage of Coals brought from the Pool up as far as Blackfriars Bridge, would be completely saved.

Carts and Waggon to convey the Coals from these Dépôts might be loaded at the Back of the new Wharfs, without disturbing or obstructing the Business transacted thereon. And the Three new Roads, which I propose to be called Upper and Lower Coal Street, which communicates with the Two Coal Markets, and meets New Stamford Street at Right Angles on the Surry Side, as seen in the Ground Plan. Report says that Old Stamford Street is to be continued to Westminster Road; if this takes place, it will still add to the Improvements, and the Whole might at present be effected at a moderate Expense, which would, besides other Advantages, decrease the Expense of Cartage on that Side of the Water very much. The Frauds committed, and the Expense of Lighterage can be saved by this Plan only.

The Lighterage on Coals at this Time taken from the Ships in the Pool, and delivered between London Bridge and Blackfriars, is 1 s. 6 d. per Chaldron, which amounts to £. 22,500 per Annum, taking the Number of Chaldrons consumed in London at 800,000 according to the Report, of which 500,000 are supposed to come above London Bridge. I presume that 300,000 of them will be delivered between the new Bridge and Blackfriars, as the Conveniencies of the Dépôts will draw them to that Situation. This will agree with the Saving as above.

The Savings on Lighterage as above stated would form a small Part of the Benefits that the Public would derive from the Adoption of this Plan, it being admitted by some of the leading People in the Coal Trade, on a Supposition that this Mode could be immediately put in Practice, that it would reduce the Price of Coals 8 s. or 10 s. per Chaldron, which for the last Two Years the Average Price has been 51 s.; therefore we may reasonably suppose that Public Deposits as above described, accompanied with other Regulations relative to Meters and Measurement, which Parliament might think most adviseable to adopt, would greatly tend to regulate the Supply, and reduce the Average Price, say only 5 s. per Chaldron, would amount to £. 200,000 per Annum, on the general Consumption of London; independent of £. 22,500 saved on Lighterage as above stated.

These Markets might be undertaken by some respectable Company under certain Restrictions and Regulations, confining them to supply the great Consumers, such as Sugar Bakers, Brewers, Distillers, and Iron Founders. Their Wants being regularly supplied, would tend to prevent any sudden injurious Competition which might hurt the Public.

I am of Opinion, that a Plan similar to the above would furnish a regular Supply of Ballast for dispatching the Coal Ships, and when the Excavation and Contraction of the River takes place, it will be adviseable to leave the Velocity of the Current in that Part of the River a little increased, which will produce a good Effect on
scouring

Jas Douglass,
Engineer.

Appendix, C.

MR. WILSON'S ESTIMATE OF SPECIFICATION of a Cast Iron Bridge
over the Thames.

ARCHES, Three of Cast Iron, to consist of Ten Ribs each; these Ribs to be Six Inches thick, and be placed Four Feet and a Half asunder, and connected together by hollow Tubes of Cast Iron at Bottom, and covered with Plates of the same Metal at Top, giving a Breadth of Forty-five Feet, to be divided into Nine Feet on each Side for Foot Path, and Twenty-seven Feet for Carriage Road.

PIERS, Four, to be composed of Stone (or Cast Iron) Fifty-two Feet wide in the Direction of the Stream, and in Breadth Thirty Feet, with Columns or other Ornaments: Two of these to have Cutwaters projecting on each Side.

BALUSTRADE of Cast Iron, Six Feet Six Inches high, including the Panel upon which it stands, on the Top of which may be placed the Lamps.

ESTIMATE.

£.

1,550 Ton of Cast Iron, for Arches and Ribs, at £.13 per Ton	20,150
600 Ton of Cast Iron Plates for Cover, - - - at D°	7,800
330 Ton of D° for Pannels for Balustrade to stand on, at D°	4,290
250 Ton of D° for Balustrade, - - - at D°	3,250
204 Ton of D° for hollow Tubes, - - - at D°	2,652
66 Ton of Screw Bolts, at 6d. per lb. - - -	1,400
10 Ton of Lead, at £.20 per Ton - - -	200
4 Ton of Cast Iron for Stays and Braces for Pannels at £.13 per Ton	52
Patent Right - - - - -	3,910
Freight from Hull, at 10s. per Ton - - -	1,502

Scaffolding for Arches to be turned on.

31,200 Cubic Feet Fir Timber. including squaring and framing	
at 3s. per Foot - - - - -	4,680
11,200 Square Feet Two and a Half Fir Deal, at 8d. -	373
33 Tons of Screw Bolts and Straps, at 6d. per lb. -	700
150 Shoes for Piles, at 5s. - - - - -	58
Ropes and other Materials necessary - - - - -	300
Wages for Sixty Men, Twelve Months employed putting up the	
Arches - - - - -	3,744

£. 55,061

For Sale of Timber, &c. &c. when done with	2,500
Engineer's Expenses and Gratuity not included.	

Appendix (D.)

Letter from GEORGE DANCE, Esq; with Drawings or Designs for the Improvement of London Bridge.

To the Honourable the Select Committee of the House of Commons, upon the Improvement of the Port of London.

MY LORD, AND GENTLEMEN,

HAVING received Information in a Letter, signed Henry Coles, and dated April 17th, 1800, that this Honourable Committee is ready to receive any Plans that may be submitted to them for the Purpose of erecting a new Bridge in the room of London Bridge; and being likewise desired in another Letter from Mr. Coles, dated April 26th, to distinguish the Difference which may arise in Facility of Execution and in Expense, supposing the said Bridge to be constructed with an Archway, either 80, 70, or 60 Feet high; I have made Drawings and Estimates for that Purpose, which I beg leave herewith to exhibit to this Honourable Committee.

The Drawing marked with the Letter A. contains Six different Modifications of the general Form and Dimensions of a Bridge of Five Arches. Plate XIII ;

The Three Designs, numbered 1, 2, and 3, exhibit the general Form and Dimensions of a Bridge, either with an Arch of 80, 70, or 60 Feet high, the Ascent or Acclivity of the Surface or Road over the same having the Inclination of Holborn Hill, which is nearly Two Inches Rise in a Yard. Nº 1. 2. 3.

The Three Designs, numbered 4, 5, and 6, exhibit the general Form and Dimensions of a Bridge, either with an Arch of 80, 70, or 60 Feet high, the Road over the same having the Inclination of Ludgate Hill, which is nearly One Inch Rise in a Yard. Nº 4. 5. 6.

These Drawings exhibit at one View the Length of Land Bridge, and the Point where the Commencement of each Bridge would cut the Plane of the Pavement on each Side of the River.

I have estimated the Expense of erecting each of these Bridges with Aberdeen Granite, as follows; viz.

Nº 1.	Purchase of Premises	- - - - -	£. 161,500
	Bridge, with the Inclination of Holborn Hill, and		
	a 60-Feet Arch	- - - - -	706,484
Total Expense of Nº 1			<u>£. 867,984</u>

N° 2.	Purchase of Premises	-	-	-	-	£.
	Bridge, with the Inclination of Holborn Hill, and					211,250
	a 70-Feet Arch	-	-	-	-	772,732
	Total Expense of N° 2.	-	-	-	-	£. 983,982
N° 3.	Purchase of Premises	-	-	-	-	253,400
	Bridge, with the Inclination of Holborn Hill, and					824,450
	an 80-Feet Arch	-	-	-	-	824,450
	Total Expense of N° 3.	-	-	-	-	£. 1,077,850
N° 4.	Purchase of Premises	-	-	-	-	493,050
	Bridge, with the Inclination of Ludgate Hill, and					843,526
	an Arch of 60 Feet high	-	-	-	-	843,526
	Total Expense of N° 4.	-	-	-	-	£. 1,336,576
N° 5.	Purchase of Premises	-	-	-	-	599,450
	Bridge, with the Inclination of Ludgate Hill, and					936,271
	a 70-Feet Arch	-	-	-	-	936,271
	Total Expense of N° 5.	-	-	-	-	£. 1,535,721
N° 6.	Purchase of Premises	-	-	-	-	720,100
	Bridge, with the Inclination of Ludgate Hill, and					1,039,222
	an 80-Feet Arch	-	-	-	-	1,039,222
	Total Expense of N° 6.	-	-	-	-	£. 1,759,322

Plate XIII.

And here I cannot but observe, that the Ascent of Holborn Hill is intolerably inconvenient, and if protracted to the Length which even a 60-Feet Arch would require, must be an insufferable Nuisance in a great Metropolis. At all Times heavy loaded Carriages require to have their Wheels locked in going down this Hill; and in frosty Weather, it may be truly said to be impassable for such Carriages. Ludgate Hill seems to me to be the steepest Ascent admissible in this Case, which, if adopted for a Bridge with an Arch of 60 Feet high, would extend its Termination, on the London Side, as high as somewhat above Eastcheap, and on the Borough Side of the River considerably beyond Union Street in the Borough, as will appear by inspecting the Drawing, N° 4. on Letter A.

It appears to me, therefore, that any Bridge constructed with an Arch sufficiently high to admit of the easy Passage of Ships, must necessarily involve immense Expense, intolerable Inconvenience by the Distance of its Terminations, and great Deformity; under this Impression, I have taken the Liberty to submit a Plan of my own, which, I flatter myself, would

would afford very convenient Passage for Shipping, without any Interruption to the Public, and be capable of being made the noblest Entrance into a great City of any now existing in the World.

This Design I have exhibited in Three Drawings, marked B, C, and D. It will appear by these Drawings that, instead of One high Bridge, I propose to erect Two low and level Bridges, at the Distance of 300 Feet asunder, with a Drawbridge in each for the Passage of Ships, and by the alternate opening of these Drawbridges at suitable Times of Tide, under the Regulation of a proper Officer, and such Signals, by hoisting Flags, or otherwise, as might be adopted, the Public would always have an uninterrupted Passage over one of the Bridges, whilst the other was open to admit the Ships. Plates XIV.
XV. and XVI.

The Passage of Ships through these Drawbridges, is evidently an Object of no more Difficulty than the Entrance into all Docks.

The present Bridge might continue untouched until the upper new Bridge was completely finished, fit for Use; by which Means the whole Work would be accomplished without any Interruption of the Passage over the River; and as soon as the upper Bridge was completed, the old one might be removed in part, so as to give free Waterway, and thereby get rid of the Fall, leaving so much of it standing as might be made extremely useful in the Progress of the Works of the lower Bridge.

In the Drawings herewith exhibited, I propose only One Drawbridge in each of the new Bridges, and I am inclined to think, from such Information as I have been able to obtain, that One in each would be sufficient; but the Adoption of a greater Number would not affect the Principle of my Design, if, upon due Consideration, they should be found necessary.

The Space between the Two Bridges being furnished with all proper and sufficient Mooring Chains, to moor the Ships Head and Stern, and every necessary Convenience of Iron Rings and Piles against the Piers for warping, the Ships may be perfectly secured in Groups or Tiers, during their Transit through the Bridges, in such orderly Distribution as not to interrupt the free Passage of Lighters and Barges. The Distance which I have proposed, of 300 Feet between the Bridges, appears to me sufficient for the Purpose; if a larger Space should be thought necessary it would of course increase the Expence in the Purchase of Premises for the Access to the Bridges; but I do not see any other material Objection to extending the Basen even to the Width of 400 Feet.

Of this Design I have made Three different Estimates, as follows:

First. ESTIMATE of the DESIGN, as exhibited in the Drawings, with the Great Area round the Monument. £.

The Two Bridges of Aberdeen Granite - - - 695,187

The circular Terminations at each End of the Transit Basen,
with the great Flights of Steps for landing and taking Water 41,645

Total of Bridges and their Appurtenances - - - } £. 736,827
Carried over - - - }

Brought over £. 736,827

Purchase of Premises to form the Great Avenue on the London Shore.

3,302 Squares of Buildings at £.150 per	£.
Square of 100 Feet superficial	- 495,300
Deduct 1,790 Feet Frontage, at 50s. per	
Foot, and 25 Years Purchase, worth	111,875

Purchase of Premises on the Surrey Shore.

1,231 Squares of Building at £.150 per		
Square	- 184,650	
Deduct 723 Feet Frontage at 50s. per		
Foot, worth	- 45,188	
	<u>139,462</u>	522,887

Rebuilding St. Magnus Church	- - - -	20,000
------------------------------	---------	--------

Total Expense of this Design as exhibited in the Drawings	£. 1,279,714
---	--------------

Secondly. ESTIMATE, supposing the Avenue on the London Shore to be limited to the North Side of Thames Street, and extending East and West from Wheatshaf Alley to Botolph Lane, and on the Surrey Shore an Avenue of 100 Feet in Width.

Bridges as before	- - - -	£. 736,827
-------------------	---------	------------

Premises on the London Shore:

889 Squares of Buildings, at £.150 per	
Square	- 133,350
	<u>133,350</u>

Premises on the Surrey Shore:

690 Squares of Buildings, at £.150 per	£.	
Square	- 103,500	
Deduct 400 Feet of Frontage, at 50s.		
per Foot, worth	- 25,000	
	<u>78,500</u>	
		211,850

Rebuilding St. Magnus Church	- - - -	20,000
------------------------------	---------	--------

Total of Second Estimate	-	£. 968,677
--------------------------	---	------------

Thirdly. ESTIMATE, supposing the Avenues to the Bridges on both Sides of the River to be limited to about an Average of Eighty Feet, and the Terminations of the Transit Basin to be strait Walls instead of the circular Ends and Flights of Steps.

Bridges, exclusive of circular Terminations to the Transit Basin and Flights of Steps	- - - -	695,187
Strait Wharf Walls	- - - -	27,000

Carried over £. 722,187

	Brought over	- -	£. 722,187
Premises on the London Shore :			
201 Squares of Buildings, at £. 150. per Square	£.		30,150
Premises on the Surrey Shore :			
368 Squares of Buildings, at £. 150. per Square			55,200
			<u>85,350</u>
Total of Third Estimate	- -		<u>£. 807,537</u>

The Calculation of the Premises to be purchased in the above Estimates, is founded upon an Average of recent Purchases, actually made for the Improvement of the Entrance into the City at Temple Bar. Those Masses of Ground covered with Buildings, including small Alleys and Yards, contain by Admeasurement 590 Squares, 86 Feet. This Quantity was purchased for the Sum of £. 74,992, which Sum paid not only for the Fee Simple of the Premises, but also for Lessees Interests and for Good Will, the Value having been settled by Verdicts of Juries, or by Agreement with the City Committee. The above Quantity at £. 125. per Square, amounts to £. 74,857. 10s. nearly the Sum actually paid; but as I think the Buildings in the present Case are of somewhat more Value, I have added £. 20. per Cent. and have therefore valued the Whole at £. 150. per Square. In considering this great and important Subject, it naturally occurs, that the Improvement of the general Shape of the River between the present Bridges, by embanking in some Places, and lessening the Projections in others, is an Object of great Moment. I shall not presume to say more on this Head, nor trespass upon this Honourable Committee, by attempting any further Description of my Plan in Words: The Drawings will answer that Purpose much better, and I am afraid to trust myself to speak of the interesting and magnificent Effect which the local and combining Circumstances of this Design would produce.

I regret that my necessary Avocations have prevented me from submitting to this Honourable Committee, more detailed and perfect Drawings.

I have the Honour to be,

My Lord and Gentlemen,

Your most obedient

Humble Servant,

Geo. Dance.

Upper Gower Street,
July 2d, 1800.

Appendix, (E. I.)

REPORT to Common Council on BLACKFRIAR'S BRIDGE, EMBANKMENT, and SURREY ROADS. 1784.

PECKHAM, Mayor. A Common Council, holden in the Chamber of the Guildhall of the City of London, on Friday the Fourteenth Day of May 1784, and in the Twenty-fourth Year of the Reign of our Sovereign Lord George the Third, King of Great Britain, &c.

THE Committee, appointed to carry into Execution the several Acts of Parliament, for building and completing the Bridge at Blackfriars, &c. did this Day deliver into this Court a Report in Writing, under their Hands, which was read, as follows:

To the Right Honourable the Lord Mayor, Aldermen, and Commons, of the City of London, in Common Council assembled.

WE, whose Names are hereunto subscribed, of your Committee, to to whom it was referred, to put in Execution several Acts of Parliament, for building a Bridge cross the River Thames at Blackfriars, and making Streets and Ways leading thereto, on the London Shore; for embanking the North Side of the River Thames, from Paul's Wharf to Milford Lane; and for making new Roads in the County of Surrey, leading from the South End of the said Bridge; beg leave, at this Time, to lay, and submit to this Honourable Court, a general State of our Proceedings; that, from a Consideration thereof, this Honourable Court may be able to judge of the Whole; and thereupon give such further Directions as may appear proper.

In order to bring these great Undertakings, and the various Proceedings therein, to the Knowledge and Recollection of the Members of this Honourable Court, as well as to shew and explain the Point to which these Transactions have been brought; we have directed our Officers to state a Narration of the Whole from the Beginning, extending through a Period of Twenty-five Years, and assigning the general Motives for each Transaction, in as concise a Manner as possible.

From them we have received the following Paper hereunto annexed, N^o I. in the Appendix; which contains all that seems necessary on this Occasion. The several Accounts, stated also in the Appendix, are faithfully compiled, after a pointed and minute Examination of all the Books of Accounts, and every Item thereof, for the said Period of Twenty-five Years, being made by a Special Sub-committee, appointed for that Purpose.

This

This Examination became necessary at this Time; as each of these Three great Works, the Bridge, the Embankment, and the Surrey Roads, are finished; and, with some Exceptions, almost completed: And as the separate Accounts of their respective Expenses are therefore approaching to a State of being finally closed;

It is necessary to refer this Honourable Court, for a clear and comprehensive Idea of all these Transactions, to the Abstracts and State of the Three several Accounts; wherein the Receipts and Payments of Mr. Chamberlain's Books are set forth, according to the Appropriations of the Monies. See the Appendix, N^o II. N^o III. and N^o IV.

Reference to
the Chamber-
lain's Ac-
counts.

It has so happened, however, that, at former different Periods, some Time one Fund, and some Time another, were indebted to each other, or had a large Surplus in Hand. This was owing to the Execution of the Works not keeping Pace with the Receipts; or the Disbursements of one Period exceeding the Money then borrowed; which could not be always in small Sums, nor suiting exactly the Transactions and Purchases made.

The many Difficulties your Committee have had to surmount; the numerous, various, extensive, and sometimes minute Purchases they were obliged to make; the Number of Surveys, Plans, Valuations, and Estimates, necessary for that Purpose; the many Negotiations they had, and the legal Measures they were sometimes compelled to take for settling the respective Values thereof; the Variety of intricate Titles to be examined, and Conveyances to be settled; the occasional Want of Stone, and frequent Combinations in the Island of Portland, and among the Masters of Shipping; and the many and great unavoidable Accidents, commonly attendant on all great Undertakings; no one will be surprized, that the Execution of such extensive Trusts should have been protracted, and not finished till the present Times.

Reasons why
the sundry and
great Under-
takings of the
different
Works were
not sooner
finished.

Your Committee having thus stated, generally, the present Situation of their Affairs; they think it incumbent to give some Account and Explanation of the present Situation of these Funds; and of certain Parts of their Transactions and Disbursements; which, in order to be understood, may appear, in the Opinion of some, to deserve particular Notice.

It is to be observed, that, in the first of these Abstracts, the Sums charged on the Bridge Account, as paid to the several Artificers, includes the Sum of £.5,830. for arching over and filling up Fleet Ditch, and making the Way from Fleet Street to the upper Ground, in the Parish of Christ Church, Surrey, which includes Albion Place; the Sum of £.5,000. for piling the Foundation of the several Piers; and the Sum of £.2,167. for making, altering, and repairing the temporary Bridge:
which

Explanation of
the Expendi-
ture of differ-
ent Sums of
Money for
sundry Erec-
tions, &c.

which several Sums, with others for Works done since to various Parts thereof, being deducted, the nett Expense of building the Bridge itself is found to be £.152,840.

The Bridge
Account.

On that Fund it is also to be observed, that the same is indebted, at present, to Mr. Chamberlain, in the Sum of £.1,352. 12s.; but this Debt, together with some small Bills of Works lately done, amounting to about £.200. will be soon discharged by the Receipt of Monies payable by the City of London, in its Corporate Capacity, for Grants of Waste Ground in Front of some Parts of the Corporation Estates, on the East Side of Bridge Street, for Leave to inclose and build on the same.

It therefore may be taken for granted at this Time, that the Bridge is completed, and the Account thereof (except as to what is hereinafter stated) is closed and balanced.

But, at the same Time, it is necessary to mention, that although great Sums have been appropriated for this Purpose, and the greatest Pains and watchful Economy have been exerted in the Appropriation of these Monies, yet, in the Proceedings from 1767, the Money then granted would not have proved sufficient and adequate. This Fund would have required very considerable further Supplies, had it not been for the Sale and Disposal of certain Pieces and Parcels of Ground, which remained of those purchased at the Expense of this Undertaking.

The Fund, however, stands yet indebted to the Commissioners of Pavements, &c. in the Sum of £.1,259. 18s. 8d. and to various Tradesmen, for Repairs to the great Sewer, £.682. 17s. 4d. On the Whole there is now wanted, including Works necessary to be done, and Monies to be replaced, the Sum of £.7,290. 5s. 3d. agreeable to the Account and Estimate, N^o V. in the Appendix, to put the Fund of the Bridge out of various Debts, and to make a final Close of its Accounts.

Explanation
how the said
Debts in-
creased.

How it comes to be so, that the £.58,000. has not proved sufficient, is easily to be accounted for. The Opening into Thames Street cost, in the Purchases made, a great deal more than was estimated; for, in the Performance of that Business, the Line of the Street crossed such a Variety of Property in an oblique Manner, and separated one Part thereof from another respectively, that the Monies obliged to be paid exceeded far every reasonable Computation which could be previously made of it. No Method was left untried, by Juries and otherwise, to keep the Whole as moderate as possible.

Opening
Thames Street.

That Opening has fully answered, in its general Utility, the Expectation of the Public; for, besides a direct Communication which it gives for all heavy Carriages to the Bridge from Thames Street, it affords an easy Communication from thence to all the Western and Northern Parts of the Metropolis; to the great Relief of the Streets in a Line with St. Paul's, and the narrow Streets leading thereto.

There

There is an Estate, belonging to a Family named formerly Genew, now Turner, of £. 200. a Year, in Lease to the City of London, renewable for ever: This lay at Blackfriars Stairs; and on the Buildings thereon being burnt down, the first Idea was then suggested, of a Bridge being erected near this Situation. The greatest Part of the Estate is now in the Highway, and the Committee were not informed of it at the Time the last Monies were applied for in 1767, but apprehended it belonged in Fee to the City of London. A Demand was made lately on this Head, and the Sum of £. 6,000. was made over, from the Funds of the Bridge, to the City, in its Corporate Capacity, to indemnify the Coporation for paying the said £. 200. a Year for ever.

Estate of the Family of Genew, now Turner, in lease to the City of London.

The Committee were obliged in Equity to pay the City also £. 2,200. for the Use of the said Ground for Eleven Years; First, as a Work and Timber Yard for the Bridge Offices, &c.; and afterwards, for its being laid in Part into the Highway, and in Part built on, and thereby producing Ground Rents.

Purchases of Property, in a crowded City, where Plans and Surveys cannot always be previously and accurately made, and where Property is in so intermixed and combined a State, there is no certain Information to be had till the Moment it is to be taken down or laid Waste; are of all others the most uncertain in their Nature, and therefore incapable of a true Estimation. It is not wonderful therefore, that the Exceedings which have been stated, are such as they turn out to be, and make a considerable Part of the Expenditure in this Account, being £. 35,584. 15. 11d.

Difficulty of purchasing Property.

Indeed the Funds for the Bridge, provided as above-mentioned for these Transactions, could not have held out so long under such large and unexpected Demands.

The Committee were therefore under the Necessity of turning their Attention to some Method of raising further Sums, to perfect the Avenues on the London Side, and perform any additional Works to the Bridge, the Stairs, and Sewers, which have unavoidably occurred during Thirteen Years from 1770; the Period when the heavy Part of the Works was nearly finished.

Intention of raising further Sums to complete the Avenues, &c. on the London Side of the Bridge.

Before any Thoughts were entertained of an Application for more Monies, your Committee looked into the Nature of the Property left remaining; an Estate, chiefly composed of Ground Rents, and Rents arising from Licences to inclose and build on Waste Ground, which had been formed and constituted out of the Remnants and Residue of the several Purchases they had been enabled to make. These had been preserved with the greatest Care, and some of them let on building Leases for the Term of Ninety-nine Years, or granted in Perpetuity. The Ground Rents were well secured by good Buildings being erected thereon, it was therefore resolved to bring these to a Sale; and, since they were produced

Application of the Money arising out of the Sale of fundry Premises to the Bridge Trust.

out of the Public Monies of this Trust, to apply as already mentioned the Value of them to the same Purposes, in virtue of a special Clause in the Act of Parliament for that Purpose.

Possession of
Estates by the
City of Lon-
don,

The City of London, in its Corporate Capacity, were and are possessed of several Estates in this Neighbourhood; and the Contiguity of the one to the other suggested an Idea, that at least as much Money would be given for these Premises above-mentioned, amounting in Ground Rents to a nett Income of £. 240. 4 s. per Annum, clear of Land Tax, by the City, as would arise from an advertised Sale thereof. These Ground Rents were offered to the Committee of City Lands in a public Manner; and after some Treaty, Thirty Years Purchase was agreed to be paid for them. This Honourable Court, on proper Reports being made by both Committees of this Proposition, and judging the Principle to be proper, were pleased to approve of it, and the Sum of £. 7,206. was thereby paid to the Credit of the Bridge Funds.

Explaining the
incurring of
Sundry Debts.

An Article of the Estimate of Monies due at this Time, requires some Explanation: It is a Debt incurred chiefly last Summer, which, including £. 200. paid on Account, and amounting in all, to £. 882. 17 s. 4d. could not possibly be avoided.

The great Sewer from Fleet Bridge to the River Thames, 12 Feet wide, and 1,036 Feet in Length, was by the first Act formed and made in Fleet Ditch and through Bridewell Dock, at the Expense of this Trust. There was a Necessity to make it crooked and bent in its Course, to answer the old Figure of Fleet Ditch, and to empty itself clear of the Bridge. Great and valuable Buildings have been, for the greater Regularity of the Streets, erected over or near to some Parts of it. Last Summer, immediately after a heavy Thunder Storm, it was inspected, and found, at some of the Turnings which it takes, that in some Places the Foundations of the Side Walls required some better Security than they then had; and another Part of it, in the Middle of the great Street, was likely, if not taken in Time, to fail, at a Place where there had been a Junction of Two Parts thereof, executed at different Periods, and under untoward Circumstances, of a temporary Carriage Way being then over head, constructed on a Scaffold, to form a Way to the Bridge, independent of the Hospital Leasehold Tenants in Bridewell Dock.

Securing the
Sewer of Fleet
Ditch.

If the Sewer had been allowed to remain in that State, it was probable a Hole would have been made in the Street, that would have prevented all Access to the Bridge; and the Houses adjoining would have been in some Sort of Danger. All this was prevented by Workmen being employed forthwith to put it in a permanent State of Security; which accordingly has been done, and a greater Expense prevented, if the Execution thereof had been delayed.

On the EMBANKING of the North Side of the River Thames, your Committee have to report, that they have received £. 9,060. for the Purpose of making and forming it; and having expended only the Sum of £. 6,435. 15s. 5d. there remains a Balance of £. 2,624. 4s. 7d.; which Sum being the Residue of Monies of that Appropriation, is expressly directed to be invested in Government or Real Securities, by the Act of the 7th of George the Third.

The Embankment.

In pursuance of executing the Powers of that Act, your Committee have been called upon to sell certain Quit Rents, payable out of the Ground so embanked, to those Parties who were by that Act entitled to make such Demand, at Twenty Years Purchase; and for such Redemption, your Committee have received the Sum of £. 3,138. 12s. 9½d. This Sum is also required by the said Act, to be invested like the other above-mentioned.

Your Committee proceeded accordingly to invest £. 5,000. Part of these joint Sums, which make together £. 5,762. 17s. 4½d. in the Public Funds; but for Reasons hereinafter mentioned, your Committee have been obliged to sell Part thereof, so that there now remains £. 2,881. 12s. 6d. invested at this Time.

There are remaining of Quit Rents, not yet redeemed, £. 45. 3s. 5½d. per Annum; which, with the Interest of the said Monies in the Funds, £. 76. 5s. 3d. per Annum, make together £. 121. 8s. 8½d. Yearly. This small Revenue has been so far inadequate to the Purposes for which it was intended (and no other Funds being expressly directed to the End of lighting, watching, cleansing, and repairing the Bridge) that Part of the Capital has been taken for this Purpose; as may be seen more particularly, by referring to the Account, N^o 3. in the Appendix.

Although there is a Balance on that Head of £. 33. 15s. 7½d. yet the Expense of last Year's Lighting, £. 153. is not yet paid and discharged.

Your Committee think it necessary at this Time to state, that a particular Survey has been by them taken, of what Works appear necessary to the Bridge, and Parts connected therewith; and that the Amount of the Expense thereof is calculated at £. 2,500. agreeable to the Estimate, N^o 6. in the Appendix, to put the Whole in that good Order which it ought to be left in, and which Works would have been done if the proper Funds had been sufficient.

Thus it appears that the Sum of £. 7,290. 5s. 3d. is necessary to pay the remaining Debts due; to perform these Repairs to the Bridge; and to replace Part of the embanking Fund, borrowed to pay these accumulated Annual Sums already stated, and incurred by the Deficiencies of the Annual Income.

Your

Your Committee have taken a View of all the Estate and Funds which are any Ways applicable at present to the Purposes of Lighting, &c. &c. and think it necessary to state an Account thereof, as in the Appendix N^o 7. amounting, at present, only to the Sum of £.172. 4s. 5d. per Annum; and if the £. 2,847. 9s. 3d. is obtained and replaced as above-mentioned, in that Case, the Annual Revenue to be depended on will only be about £.314.

To know how far such a small Revenue is adequate to the common and current Annual Expenses, in Times hereafter, we have compiled an Estimate of such Expenditure, and stated it in the Appendix N^o 8. It amounts to £599. 2s. per Annum; so that there will be a Necessity of appropriating an additional Revenue of £300. nearly for these Purposes.

It is to be observed, that the utmost Frugality has been used in the Management of this embanking Fund; and that it has not been charged with the usual Disbursements of Clerks, Accountants, Summoning, &c. &c.

It is proper to observe also, Your Committee are of Opinion, the great Sewer in Fleet Ditch (at present in a proper State of Repair) from Fleet Street to the River Thames, with other Sewers constructed by this Committee on the London Side, for Want of proper and legal Authorities over the same, and the Drains discharging their Waters therein, should be put under the general Jurisdiction of the Commissioners of Pavements, Sewers, &c. of this City.

The new Roads
in Surrey.

This Committee beg Leave to refer to the State of the ROAD ACCOUNT set forth in the Appendix, N^o 4; wherein it appears, that there remained a Balance of £. 3. 11s. 5d. in Hand at Lady Day last, and £. 6,200. Bond Debt to be paid off.

The First Article of the Receipts of your Committee on this Head is £. 657. 14s. 6d. which was stated as a Balance of a former Account on the 29th of January 1778. Previous to that Period, your Committee had only the Management of the Receipts and Payments on Account of the Tolls collected on Blackfriars Bridge, from Michaelmas 1770; and caused the Produce thereof, during that Time, to be paid into the Chamber of London, amounting to £. 44,595. 19s. 6d. for the Purposes to which it was appropriated by the Legislature.

Continuation
of the Tolls on
Blackfriars
Bridge, to assist
the Application
of Westminster
and South-
wark.

To understand this, it is necessary to state the Information your Committee have received on this Subject. By the original Intention of the Plan for raising £. 300,000. as above-mentioned, the Tolls on Blackfriars Bridge were to have ceased at Michaelmas 1770; and the Bridge, from thenceforward, was to have been free of all Toll; but, as it was necessary

to satisfy the Applications then made, from Westminster and Southwark, as above-mentioned, by a Grant of some Monies for their public Works, (since they had and have a proportional Interest in the Consumption of all Articles on which the Duties and Impositions were laid and to be continued;) and as it was apprehended in 1766, it was not possible to borrow more than the said £. 300,000. so as to pay the Interest and the Capital off, in any reasonable Period of Years, it was therefore agreed, in the Application to Parliament, to continue the Tolls as above-mentioned, to an indefinite Period, in order to satisfy that Debt.

In Mr. Chamberlain's Book there is a particular Account of the Increase, Diminution, and final Extinction, of that Debt, which happened on the Twenty-ninth Day of January, 1778, leaving the said Balance of £. 657. 14s. 6d.

Reference to an Account of the Debt incurred in the preceding Article.

Had it not been for these Two Debts of the Monies to Westminster and Southwark, and that of making the Roads, the Bridge would have been free at this Time; but an Event took place which no Foresight could have imagined.

The City of London, Trustees to the Estate for the Support and Maintenance of London Bridge, had let, on Lease, a prescriptive Toll or Tolls, for a Term of Twenty-one Years, at a Rent of £. 735, and with a Fine of £. 2,100.; and this Lease was subsisting at the Time the Act, for general Purposes above-mentioned, granted £. 30,000 for the Redemption of the said Tolls, as well for the Lessee's Interest therein, as for the Perpetuity thereof, belonging to the Bridge House Estate; but, on endeavouring to purchase, under that Act, the Lessee's Interest, it was found impossible to pay for the Whole, since it appeared the Interest of the Lessee had increased to a great Degree, by an Increase of the Use of shod Wheels, and a Decrease of slug or wooden Wheels.

Intimation of redeeming the Toll on London Bridge.

These Causes, operating to a great Degree beyond the Possibility of £. 30,000. being a Compensation for the whole Value of these Tolls, (which were to have ceased likewise at Michaelmas, 1770,) it was thought most prudent to invest that Sum in the Public Funds; to allow the said improved Lease to waste its Value out by a Continuation; and also to continue the Tolls on Blackfriars Bridge, in Aid and Assistance to that Effect, and, jointly with the other Monies, to operate and perform what was intended by the £. 30,000.

Investing the Sum proposed for the Redemption of London Bridge in the Public Funds.

All these Debts being cleared in the Manner and for the Purposes herein stated, the Tolls on Blackfriars Bridge became at last applicable to pay the Expense of making the new Roads in Surrey. Your Committee found it necessary, to defray the great Expense of making these Roads, to borrow £. 26,000. on Bonds; and that, for the Interest on the Money borrowed, Sums were from Time to Time advanced by the City for that Purpose, while the Tolls were applicable to the Extinction of the Debts above-mentioned.

Tolls on the Bridge applicable to pay off the Debts incurred, and Reference to the Account of making the Surrey Roads.

This original Debt has been lessened to £.6,200. at Lady Day, 1784, so that in all reasonable Expectation, it will be extinguished by Midsummer, 1785.

Conduct of the Committee,

In performing this Part of their Duty of making those Roads, your Committee have had much Trouble, and many Difficulties have lain in their Way; and, in a Variety of such, after trying different Methods to avoid them, they have always chosen that which seemed on the Whole the most serviceable to the Good of the Public.

Your Committee have found it very troublesome to themselves, and very dangerous to their Servants, to collect the Revenue of the Tolls on the Bridge. From the 29th of January, 1778, to Lady Day last, the nett Produce amounted to £.40.217. 19s. 10d.

Perhaps it may be suggested, that they might have produced more. Ideas of that Sort have been entertained by some Persons; but Experience of some one Difficulty or another, attending other Methods of collecting them than the present, has plainly proved, your Committee have adhered to that Method which is most productive and least vexatious to the Public.

Inconveniencies arising from collecting the Toll.

In the Collection of a Toll from Foot Passengers, in the Heart of a great City, there arise many Inconveniencies, not at all common to that of other Collections at Turnpike Gates.

Collectors Attendance.

Collectors must attend in all Seasons, and in all Weather, Night and Day, and never relax one Moment while on Duty. Hence they become numerous, and of course the Expense of Collection becomes costly.

Collection of bad Money.

The great Circulation of bad Money, of late Years, has fallen very heavy on the Amount of this Toll, for it was found impossible to contest the Point of the Quality of a Halfpenny with every Foot Passenger; and when it was tried to be contested, so that no bad Money should at all be received, the Assaults and Lawfuits, which arose from these Disputes, turned out to be more grievous and expensive than the Money attempted to be saved.

Receipts of Copper Coin decreasing in Value.

The Receipt, for the common current Copper Coin, has been for this Reason, in reality, small, in Comparison to the nominal Value; and from thence arises a great Deduction, out of the Receipt of the Tolls, for some Years past. Another Reason is, that some Years ago an Act passed which obliged all base Copper Coin to be melted down, and sold for the Value of the Metal; and made it Felony to do otherwise: Whereas your Committee, previous to that Period, disposed of the Whole, good and bad, in a mixed State, at Twice the Value of those they receive, and turn out bad, at present.

If the Public, receiving bad Money, insist on paying it away in like Manner, they are practising, in this Case, a Fraud upon themselves, and it was judged right to let the Evil fall where it ought, instead of attempting to stem a Torrent impossible to be avoided.

Payment of
bad Money by
the Public.

Your Committee, however, although they lamented the Loss, were resolved not to add to such a shameful Evil; but have taken Care that all the bad Coin should be cut and melted down, in conformity to the said Act, and sold, from Time to Time, to the highest Bidder.

The bad Cop-
per disposed of
to the highest
Bidder.

The extreme Violence of the late Riots put this Fund also to an unforeseen Expence; for the reinstating the Toll Houses and Necessaries therein, with all the Money lost and taken away, was upwards of £.1,100.

Expence that
occurred to the
Bridge in the
Riots.

The Receipt of these Tolls, from the different Collectors, is managed in as frugal a Manner as possible, and the Account of its daily Produce kept in as clear and comprehensive a Method as that of any Trust whatsoever, considering the Magnitude of it, and the daily and hourly Attention it takes.

Regulation of
the Collectors
in receiving the
Money.

The principal Receiver is paid for all this Duty, and making up the Account Twice a Day, an Annual Salary of £.80. and a Gratuity Once a Year, sometimes less, but never exceeding Fifty Guineas, for his daily Attendance, to quiet Disturbances, and regulate the Conduct of the Men.

His Salary, as Clerk to the Proceedings of the Committee, and all this vast Field of Business above stated, is only £.50. per Annum, One Half of what was paid his Predecessor.

Salary of the
Clerk to the
Committee.

With respect to Annual Salaries, for the Management of all Business under the Directions of your Committee, it is proper to state that there is paid—

1st. For the Surveyor's Superintendence of all the Business of forming the Streets, Roads, &c. and general Assistance to this Committee, on all Occasions, not merely confined to his Duty as Surveyor	£.	
2d. For the Clerk's Duty	105	— —
3d. To Mr. Chamberlain's Clerks, for the Management of the Accounts, receiving and paying all the Monies	50	— —
And 4th. Ten Shillings each Time to the Hall-keeper, for summoning and Attendance on the Committee, amounting Annually to about	20	— —
	10	— —
In all	per Annum	£. 185 — —

These Disbursements are ordered to be paid wholly out of the Produce of the Tolls at present; as the Business of making these Roads, and the Receipt

Receipt of these Tolls, was for many Years, at the Commencement thereof, not charged with any Thing in these Respects, but the Whole was managed and defrayed by Officers employed and paid for building the Bridge, out of the Funds for that Undertaking.

On the Head of Gratuities, your Committee have, at different Times, thought it Justice to reward the Services of many Years, where Officers appeared deserving. Mr. Bathurst was paid £.105. after having been Seventeen Years Clerk to this Committee; and Mr. Fielding, one of the Messengers, £.21.

Mr. Bunn has been paid, as Agent and Trustee in the Purchases and Sales of Property for the Surrey Roads, £.375. 10s. but not as a Gratuity.

Expenses of
the Committee.

With respect to such Expenses as your Committee has been the Cause of, on their own Account, or on that of the Strangers summoned to attend them, it may be safely said, that, after transacting Business for Twenty-five Years, and in that Time paying away upwards of £.250,000 the Whole does not amount to £.500.

The Conclu-
sion, and Mo-
ney wanted.

It now remains finally to remind this Honourable Court, it will be necessary to raise the further Sums wanted of £. 7,290. to pay the present Debts, and perform the Works herein stated, and £.6,000 to purchase an additional Annual Revenue of £. 300. more than subsists at present, to light, watch, &c. &c. the Bridge, in all Times hereafter. These Sums make together £. 13,290. which, with the Expense of applying for another Act, and unforeseen Expenses, will increase it to £.14,000.

All this, however, is, with great Deference, humbly submitted to the Consideration and Wisdom of this Honourable Court, by

Their respectful and obedient
humble Servants,

Dated this First Day of May, 1784.

Tho. Thorp,
Hen. Major,
Ja. Chapman,
Wm. Hallier,
Rob. French,
Cha. Aldridge,
John Clements,
T. Rigby,
Charles Wilkins,
Wm. Sharpe,
Wm. Newman,
Jer. Percy,
Ben. Bunn,
John Pinborn.

James Esdaile,
Wm. Plomer,
Nath. Newnham,
John Hart,
Wm. Wright,
Hen. Kitchen,
Wm. Hurford,
John Ellis,
Edw. Dowling,
G. Wilson,
Sylvanus Hall,
John Bailey,
Wm. Powell.

Appendix to (E. 1.)

No. 1.—NARRATIVE, &c.

THE Capital of a great Commercial Empire, being not only the Center of its Traffic and domestic Resort, but one of the principal Objects of Attention to Foreign Nations, every Subject, even the most remote, must feel himself interested in its Improvement and Embellishment.

I.
City of London.

The Common Council of London may flatter themselves, that their late zealous Prosecution of several Works of public Utility and Magnificence, within the Sphere of their Jurisdiction, is honoured with the Approbation, and will be thought to deserve the Encouragement, of every Well-wisher to the Splendour and Reputation of Great Britain.

II.
Public Works.

Whilst the Improvements of London Bridge were carrying on, the Common Council undertook to open a new and magnificent Entrance into the Center of the Metropolis, by a Stone Bridge at Blackfriars: It was a Subject much discussed for several Years; it was referred at one Time to a particular Committee, and a Report was made in answer thereto in September, One thousand Seven hundred and Fifty-four, with another annexed, by the late Mr. Dance, then Surveyor to the City Works; to wit, That it appeared, by a Plan proposed by him, a Bridge at Blackfriars would come to £.185,950. exclusive of the further Expenses in Purchases, for the necessary Avenues; and if the Foundations were obliged to be piled, it would accordingly increase that Charge.

III.
Introduction of a Bridge to be built at Blackfriars, and the Report made by Mr. Dance of the Expenses thereof.

Norwithstanding this Opinion, it was afterwards deemed necessary to proceed; not only because many Districts, in the middle Parts of the Metropolis, felt all the Effects of an approaching Decay in the internal Parts, but, it was strongly maintained, that such a Fabric might be done upon much less Expense.

IV.
Intention of proceeding with the Bridge, but doubted the Enormity of the Expense.

The City, therefore, made Application, and they obtained Leave of Parliament, to erect that Structure, with a Grant of a reversionary Toll, and a Power to borrow £.160,000. upon the Credit thereof. This Act passed in the 29th Year of his late Majesty George the Second, in the Year One thousand Seven hundred and Fifty-six. A Committee of Twelve Aldermen and Twenty-four Commoners, were appointed the Thirteenth of April, One thousand Seven hundred and Fifty-eight, to put the same in Execution; and all the Powers and Authorities contained in the said Act, which constituted the Corporation Trustees for that Purpose, were fully invested in them.

V.
Application to Parliament, and obtaining a Grant of reversionary Toll, and Power to borrow a certain Sum upon the Credit thereof, and Appointment of the Committee.

A a

The

VI.
The Decision
of the Com-
mittee, whether
the Bridge was
to be of Stone,
or Wood, and
opening a Loan
of £. 144,000.
to defray the
Progress of the
Works there-
of.

The first Consideration of this very numerous and respectable Committee naturally was, whether the intended Bridge should be of Stone, or Wood, or consist of Stone Piers, with a wooden Superstructure. Frugality, and the scanty Provision allowed for a Bridge by Parliament, strongly recommended one of the two latter Modes of Building; whilst Durability, and a Magnificence better suited to the Grandeur and Dignity of the Metropolis, more forcibly tempted the Committee to adopt the other. But how to raise a Fund adequate to such Expense, was a Consideration of much greater Difficulty, as the Act which authorized them to borrow £. 160,000. had appointed no other Security for it, than the uncertain Produce of a future Toll, and restrained them to an Interest of Four per Cent. in a Time of War, when the Government Four per Cents. were then below Par. Yet, after maturely weighing several Expedients for this Purpose, they at last adopted a Plan which seemed to promise Success, and was neither unreasonable in itself, or repugnant to the Act of Parliament. The Proposition was, to open a Subscription for a Loan of £. 144,000. payable into the Chamber of London in Six Years, by Quarterly Instalments (being what was presumed the Progress of the Work might require) with Interest from the first Payment in each Year: The Subscribers to have the City's Seal for their Security; and the City to be indemnified by the Assignment of the Toll.

VII.
Approbation
of Council to
the aforesaid
Plan, with the
Completion of
Subscription
thereof.

This Plan, being approved in Common Council on the Twenty-eighth of June, One thousand Seven hundred and Fifty-nine, was immediately carried into Execution; and being eagerly embraced by the Public, the Subscription was completed by the Fifteenth of the next Month.

VIII.
Appropriating
the Sheriff's
Fine to the
Bridge Fund.

The Corporation, from Disposition to promote Works of Public Ornament and Utility, was pleased, upon Application, June the First, One thousand Seven hundred and Fifty-eight, to appropriate the Fines payable by Persons refusing to serve the Office of Sheriff, to the Fund for building this Bridge; by which Grants no less than £. 19,000. has been added to the said Fund.

IX.
Investing the
Surplusses of
Monies into
the Stocks,
with the Gain
thereof.

To deserve this Liberality, by the Disinterestedness and Economy of Management, the Committee declined putting the Trust to any Charge on their own Account, save only where the necessary Attendance of Strangers, or Views of Premises, made some Expense unavoidable; and as Money frequently happened to flow in faster than it was wanted, the Surplusses were directed to be invested in the Public Stocks; by the advanced Prices of which, after the Conclusion of the then War, and the intermediate Dividends, there was added to the said Fund a Sum of £. 12,806. 15. 6d.

X.
Receiving of
Plans and Esti-
mates for the
Bridge. Mr.
Mylae's ob-

The greatest Object was to procure the best Design for a Building of such Importance. A Day was advertised, for receiving all such Plans and Estimates as should be offered for Consideration; in consequence of which, many Drawings and Models were presented on the Fourth of October,

October, One thousand Seven hundred and Fifty-nine. An Objection being made to the Form of the Arches, in the Design presented by Mr. Mylne, as deficient in Strength and Stability, the Objection was directed to be laid before Eight Gentlemen of the most approved Knowledge in Building, Geometry, and Mechanics, for their Opinion and Advice.

These were obtained in due Time; and, after deliberate Consideration thereof, in February, One thousand Seven hundred and Sixty, it was determined in Favor of Mr. Mylne's Design. The Form of his Arch was not only best adapted to the Navigation at all Times of Tide, without raising the Carriage Way to an inconvenient Height, but by the Manner of its Composition much stronger than the Semicircular Arch, constructed in the common Way; whilst, at the same Time, by its Width, and, of course, requiring fewer Piers, it bid fairest to come within the Compass of such moderate Funds. On the Twenty-seventh, Mr. Mylne was elected Surveyor.

The Proceedings of the Commissioners for Westminster Bridge were then consulted, and the Committee advertised for Proposals, which required a Specification of different Prices in Peace and War, a Caution never before practised, but by which they saved to the Building Fund a Sum of £. 5,839.

On the Third of April several Proposals were delivered in; and finding, upon due Examination thereof, and by proper Calculations made thereon, that Mr. Phillips, for the Mason and Carpenters Work, Mr. Bryant, for the Smiths Work, and Mr. Cox and Three others, for the Ballast Work, were the lowest Proposers, the Committee declared them so accordingly. In forming the Contracts, it was directed they should be full and particular, so as not to admit of any Doubt thereafter, either in the Execution or Payment; and that the same should contain explicit Rules for the Admeasurement of every Species of Work (in almost all the Articles different from the common Mode) by which Precaution a considerable Sum was likewise saved to the Fund.

On the Thirty-first of October, One thousand Seven hundred and Sixty, the First Stone was laid by the Right Honourable Sir Thomas Chitty, then Lord Mayor.

The Drafts of the Contracts being afterwards completed for the Mason and Carpenters Works, were objected to by Mr. Phillips, both on Account of the Mode of Admeasurement therein laid down, and the Manner of carrying on the Work proposed by the Surveyor; the Committee, therefore, thought it most prudent to release Mr. Phillips from an Engagement, which, from the Nature of his Objections, he was not likely to execute with Spirit and Alacrity.

jected to in Part, and ordered for Enquiry, with Advice, &c.

XI.
The Determination in Favor of Mr. Mylne's Plan, and his being appointed Surveyor.

XII.
Advertising for Proposals for the different Works.

XIII.
Proposals received, and the Choice of different Artificers.

XIV.
Release of Mr. Phillips from his Contract, on account of Objections of the Surveyor; Drafts of his Contract not being to his Mind.

Fresh

XV.
Fresh Propo-
sals ordered,
received, and
appointing the
different Per-
sons thereto.

Fresh Proposals were then ordered for the Mason and Carpenters Works, to be advertised for, which being soon after delivered in, on due Comparison thereof Mr. Joseph Dixon, for the Masons Work, and Messrs. Richard Dixon and John Spencer, for the Carpenters Work, were declared to be the lowest Proposers; and, their Securities being approved, the Contracts were soon after settled and executed.

XVI.
Commissioners
Directions to
the Surveyor
respecting the
Foundation,
&c.

What had happened to Westminster Bridge, cautioned the Committee to be particularly attentive to the Foundations; and accordingly directed the Surveyor to bore, and examine the Foundation of every Pier, and to report his Observations thereon; and, agreeable to his Reports, directed them to be piled, in proportion to their respective Textures and Solidities; he having convinced the Committee of the Practicability of driving Piles under Water, and of cutting them level with the Bed of the Foundations, by an Invention of his own; which Precaution, though purchased at an additional Expense of £.5,000. has fully answered in the Stability of the Bridge.

XVII.
Fixing the
Bridge in the
best and most
direct Manner.

In fixing the Position of the Bridge, Two essential Objects were necessary to be attended to; First, its Direction cross the River, so as to be nearest at right Angles with the Streams of Ebb and Flood; and, Secondly, its Situation with respect to the Bed of the River, so as best to answer the Purposes of Navigation at all Times of the Tide.

XVIII.
Fixing the
great Arch
nearest the
Surrey Shore.

The great Inequality in the Bed of the River at Blackfriars, whereby the Depth of the Stream was thrown towards the Surrey Shore, made it expedient to place the great Arch nearer the latter than the former; as otherwise most of the Arches on the London Side would, at Low Water, have stood upon dry Land, and thereby a great Part of the Bridge, in this Period of the Tide, would have been rendered useless to the Navigation.

XIX.
Many Difficul-
ties attending
the Construc-
tion.

In consequence of this Position of the Bridge, it became necessary to extend the North to a greater Length than the South Butment; which apparent Defect, in the Symmetry of the Whole, was considered as likely to be removed (as in Fact it afterwards was removed) whenever the then Disadvantages attending the irregular Form of the Banks, and Course of the River, and the great Projection of the Shore at Low Water, into the River at Blackfriars, should appear to require an Embankment there. With a View to this Improvement, the North Butment was directed to be so constructed as to be easily adapted to it, whenever that should take place.

XX.
The Bridge
passable. The
Erection of a
temporary
Bridge. An
Account of the
Produce of the
Toll.

As soon as a Part of the Bridge was made passable, it was endeavoured, by Means of a temporary Bridge, both to accommodate the Public with a Passage cross the River, Two Years sooner than they could otherwise have expected, and by the Toll thereof in that Time to improve the Building Fund. The Experiment fully answered Expectation. The Produce of the Toll having not only defrayed the Expense of Collection, the

the Interest of the Money paid to the Watermens Company for the Sunday's Ferry, sooner than otherwise would have been done, and the Charge of erecting, altering, lighting, and watching the said temporary Bridge, but added also to the said Building Fund a Sum of £. 1,757.

During these Operations, the Committee were no less attentive to other essential Services, by which alone the Bridge could be rendered useful: To wit, The making proper Avenues or Approaches thereto, on both Sides the River. For this Purpose many great Purchases were made, and particularly one from the Governors of Bridewell Hospital, the Treaty for which was Nine Years in Agitation; and, but for the Candour and public Spirit of the Parties, might never have been concluded without the Interposition of a Court of Equity, to settle and ascertain the complicated Rights of the Hospital, the City, and the Public. These Purchases enabled them soon to make a sufficient Passage from Fleet Street to the Bridge; great Part of Fleet Ditch being arched over and filled up, the Ground raised to a sufficient Level; the Eastern Boundary of the Street staked out; Part of the Hospital pulled down, some Grounds let on Building Leases, and Houses building according to an uniform Design prepared for the Whole. But for Want of the Property of some of the Hospital's Tenants, the Plan of the grand Street, as to Figure and Extent, was not entirely completed for some Years; an Inconvenience thought better to be submitted to for a little Time, than complying with unreasonable and exorbitant Demands.

XXI.
Purchases of
fundry Ground
to make the
Avenues to
the Bridge.

It is but doing Justice to the Committee, entrusted with the Direction of this great Work, during these expensive Periods, to say, that no Care, Application, or Economy was wanting on their Part; and yet the Expense of the Bridge, with the necessary Disbursements attending it, and its Avenues, was not likely (as it appeared in One thousand Seven hundred and Sixty-six) to be less than £. 232,185. 12 s. 6 d. a Sum which may appear extraordinary to those who compared it with the Estimates made for the Bridge itself, but was thought moderate, if there was taken into the Account the Variety of Things which were not included in the original Design, and therefore could not be comprised in that Estimate; the many collateral and consequential Works to be performed; the advanced Price of Freight during the Continuance of the last War but one; the several Purchases necessary to be made, and the Interest payable on the Monies borrowed; and will at the same Time recollect, that Westminster Bridge and its Avenues (although there was no Money borrowed, and consequently no Interest paid) cost the Public upwards of £. 400,000.

XXII.
Expense of the
Bridge, and its
Avenues.

It is proper at this Time to observe, that the Roads to be made on the Surrey Side were not comprised in all the first Estimates, but were proposed to be made on the Credit of a separate Toll, such as is payable on the Roads leading to Westminster Bridge.

XXIII.
Roads on the
Surrey Side
proposed to be
made on the
Credit of a se-
parate Toll.

XXIV.
Grant and
Produce of
certain Sums
of Money,
with Disburse-
ments.

It is necessary to recapitulate, that the first Thing the Committee did, was to obtain (as above-men- tioned) from the Common Council, a Grant of the Nett Produce of the Sheriffs Fines, which amounted to

At Midsummer, 1776.

£. s. d.
16,200 — —

And borrowed in Part of the £. 160,000. authorized to be raised by the Act

144,000 — —

XXV.

These Two Sums (the latter being paid in by Twenty-four Quarterly Instalments) flowing in faster than the Work required, the Committee thought it their Duty to place a Part thereof out at Interest, and accordingly, by investing £. 41,921. 5 s. of it in the Public Funds, they made

By the Dividends, a Profit of - 6,120 — —

And by the advanced Prices of Stocks - - - - -

6,060 17 —

12,180 17 —

They also made, by the Sale of old Materials, previous to these Periods - - - - -

449 18 —

And by the temporary Rents of some Premises purchased in like Manner - - - - -

209 12 6

659 10 6

So that their Total Receipt on the Fifth of July, One thousand Seven hundred and Sixty-six, was -

173,040 7 6

Their Disbursements, to the same Period amounted to - - - - -

140,595 19 10½

Which made their Balance, the Fifth of July, One thousand Seven hundred and Sixty-six - -

32,444 7 7½

This, with what was then expected farther to be received

For Dividends of £. 16,350. Three per Cent. Bank Annuities, to Christmas, One thousand Seven hundred and Sixty-six (£. 13,650. of the

Carried forward - - £. 32,444 7 7½

	£.	s.	d.
Brought forward - -	32,444	7	7½
£. 30,000. Three per Cents. having, since Midsummer preceding, been transferred to the Watermens Com- pany) - - - - -	£. 245	5	—
Old Materials to be then sold, about	250	—	—
And Rents, about - - - -	150	—	—
Would probably make the Balance - -	33,089	12	7½

The expected Disbursements at that Time, as
stated in an Estimate, amounted to - - - 91,589 12 7½

From which deducting the said Sum of - - - 33,089 12 7½

The Sum wanted to complete the Bridge, and its
Avenues, exclusive of the Surrey Roads, appeared to
be - - - - - 58,500 — —

From the Experiment of the temporary Foot Passage over the Bridge, before it was finished, the Estimate originally formed of the Toll (on the Credit of which the Bridge itself was begun) appeared to have been founded; and there was great Reason to conclude, that the same might have been sufficient to answer the whole Expense of the Undertaking. But whoever pleased himself with the Hope of seeing this Structure, when completed, a great Ornament of the first City and principal River of the Kingdom, would be hurt with the Prospect of its being encumbered and obstructed by a Toll. It was, therefore, wished to see some other Fund provided for it, such as the Circumstances of the Times would bear; and it was with this Intention a Plan was offered to Common Council, for paying off the £. 144,000. already borrowed, and for raising, among other Sums, the £. 58,500. which appeared to be then wanting.

There was an Improvement, which the Course of the River, and Form of the Shore between Paul's Wharf and Milford Lane, made very desirable, if not absolutely necessary: It has been already mentioned. But, to understand what afterwards followed, it is necessary to be more explicit.

The Wharfs within those Limits, by their different and very unequal Encroachments, not only formed an irregular and disagreeable Outline, but afforded the Owners of some an undue Preference and Advantage over others; at the same Time that the reflected Sett of the Tides, both of Ebb and Flood, forced the Stream upon the Surrey Shore, opposite to Blackfriars, and, of consequence, slackened the Current on the London Side.

XXVI.
A Plan offered
to Council by
taking off the
Toll, and pay-
ing off the Sum
of £. 144,000.
and for raising
the Sum of
£. 58,500. to
clear the same.

XXVII.
Improvement
of the River
between Paul's
Wharf and
Milford Lane.

XXVIII.
Explanation of
such Improve-
ments.

Side. This, together with the large Sewers that empty themselves in the Neighbourhood, occasioned a constant Accumulation of Sand, Mud, and Rubbish, which not only destroyed great Part of the Navigation at Low Water, but rendered the Wharfs inaccessible by loaded Craft even at High Water, unless at Spring Tides. The Mud and Filth thus accumulated, notwithstanding the frequent Expense the Wharfingers were at to clear it away, was, when not covered with Water, extremely offensive.

XXIX.
Placing of the
great Arch.

The Depth of Water being, by this Circumstance, thrown towards the Surrey Shore, so as to occasion a Difference of Eighty-seven Feet, between the Middle of High and Low Water, it was found absolutely necessary to place the Center Arch of the new Bridge, if not upon, yet near the deepest Water, and, consequently, much nearer the Surrey than the London Shore.

XXX.
Sundry Alterations for
the Benefit
of the River
and Proprietors of different
Wharfs,
&c. with Embankments.

In consequence of this Position of the Bridge, it became necessary to extend the North Butment, and make it longer than that on the Surrey Side. This Alteration was, for these Reasons, recommended as not only advantageous to the Navigation of the River, but greatly conducive to the Health of those Two populous Cities. To that End it was proposed, that the Land Owners on the North Side of the River, between the West Corner of Powell's Wharf, near Puddle Dock, and the East Corner of Roberts's Wharf, near Milford Lane, should be at Liberty to embank in the Line and Manner above-mentioned. And that the Ground thereby acquired, be vested to the Uses and Trusts of the original Property, subject to a Quit Rent of One Farthing per Foot superficial, redeemable at Twenty Years Purchase; and that where any of the said Owners might desire the City to embank for them, the said acquired Ground should be subject to a Quit Rent of One Penny per Foot superficial, redeemable as aforesaid: The said Quit Rents, and Interest of Purchase Monies, to be Part of a Fund for lighting, watching, cleansing, and repairing the Bridge, in lieu of the Toll so proposed to be taken away.

XXXI.
An Account
of Monies
wanted for the
Embankment,
and clearing
the Bridge of
the Toll, &c.

For defraying the Expense of such Embankments as would be so required of the City, and the Charge of extending the public Sewers, and rebuilding the public Stairs, within the Limits aforesaid, the Sum of £. 7,500. was included in the said Plan.

Thus it appeared that there was wanted, in One thousand Seven hundred and Sixty-six, for completing the Bridge and its Avenues

£.	s.	d.
58,500	—	—

For exempting the said Bridge from the intended Toll 144,000 — —

For embanking the River between Paul's Wharf and Milford Lane, &c. — — — — 7,500 — —

£. 210,000 — —

But

But the £. 144,000. being a Debt already subsisting, to be paid off by Degrees, there was then Occasion only to raise the other Sums of £. 66,000.

The Plan for these Purposes (amongst others, to wit) for repairing the Royal Exchange, rebuilding the Gaol of Newgate, and redeeming an ancient Toll on London Bridge, was founded upon the Surplusses of the Orphans Fund.

The City of London had, by various Accidents and public Calamities, incurred a Debt of £. 747,472. 18s. 4½d. to their Orphans and others. The Parliament was pleased, in the Year One thousand Six hundred and Ninety-one, to convert that Debt into Annuities at Four per Cent.; and, as a perpetual Fund for Payment thereof, to establish certain Duties and Impositions, which, with certain Charges made on the City's Estates at different Periods, afforded Funds sufficient to pay off all the Debts then due, Interest, and also the Sum of £. 300,000. including the said £. 210,000. for the general Purposes above-mentioned. This Plan was fully stated to Common Council, ordered to be printed, and, after being referred to a Special Committee, and maturely considered, was adopted. Thereupon Application was made to Parliament; and, after some Variations made therein to accommodate Interests, not adverted to at first, the Sums were granted, on the Credit of the said Duties and Impositions, by an Act for that Purpose. And, amongst others, the Sums of £. 144,000. was taken from the Bridge Fund, and placed as a Debt on the Orphans Fund; and the £. 58,000. and £. 7,500. were appropriated, and particularly limited, as hereinbefore mentioned. New Powers were granted by this Act (which passed in the Seventh Year of George the Third, Anno One thousand Seven hundred and Sixty-seven) not only to embank the River as described above, but to grant Licences to build on Waste Ground in Front of any Freehold Estate; as many Parts of the Ground not wanted for the actual Breadth of the Streets, &c. would otherwise lie useless, and thereby disfigure the Uniformity of the spacious Streets adopted and laid down by the Committee, with a Magnificence and Splendour which far exceeds any other of the Approaches to this Metropolis.

The Embankment was immediately in some Parts begun; and that it was not in greater Forwardness at first, was owing, partly, to the Option of the adjoining Land Owners (in virtue of the Act of Parliament) to embank themselves, and partly to the Scarcity, and consequential high Price of Rubbish, occasioned by the Demand for it in the new Roads on the Surrey Side, where Necessity occasioned large Premiums to be given.

The Common Council, by an Order in September, One thousand Seven hundred and Sixty-eight, referred it to this Committee to consider, if it would be for the Benefit of the City to have the Fleet Prison removed to some other Place. On which they reported an Opinion,

C c

that

XXXII.

An Account of defraying the Expenses for the Repairs of the Royal Exchange, and building Newgate, and redeeming London Bridge Toll.

XXXIII.

The Incurrence of a Debt by Accidents, &c. and the converting of it by Parliament into Annuities.

XXXIV.

Beginning of the Embankment.

XXXV.

Proposals of the Committee to move the Fleet Prison, Fleet Market, &c.

that such Removal would, for several Reasons assigned, be for the Benefit not only of this City but of the Public. And being directed to proceed, they applied to the Treasury for a Removal of the Fleet Prison to Ely House, and of the Fleet Market to Fleet Prison. At the same Time, they entered into a provisional Treaty with the then Bishop of Ely; and, having reported the Terms proposed, as well by the Treasury as the Bishop, they were directed to state the Facts, with the Benefits that would arise from the proposed Exchange, and the Expense that would attend it; which having reported accordingly, they were ordered to apply to Parliament for effecting the said Exchange; but a strong and powerful Opposition from the Owners of Estates adjoining, rendered their Endeavours fruitless; and they were under the Necessity of dropping this great and benevolent Scheme.

On the Failure of this Proposition, whose principal Object was to clear the Space where the Fleet Market now stands of all Incumbrances, and, ultimately, to make a new Opening towards the Northern Roads, through Clerkenwell, it was referred to the Committee to remove the Fleet Prison into St. George's Fields. For that Purpose a Lot of Ground between the Two new Roads then making, and on the South Side of the Obelisk, belonging to the Bridge House Lands Estate, should be assigned over to the Crown in lieu of the Scite of Fleet Prison; and a Sum of Money, equal to the Difference of the actual Value of each of these Situations, was proposed to be paid by the City to the Lords of the Treasury, under the Sanction of an Act of Parliament. A provisional Agreement was actually made with the then Lords of the Treasury, under the Management of Mr. Trecothick, then Lord Mayor, and Member for this City. Common Council, however, were pleased to think otherwise of this Proposition; and the great Labours of the Committee were put an End to, by the Committee being discharged from proceeding therein.

XXXVI.
Application of
Mr. Adam to
embank a Part
of the Thames.

The Common Council having also in February, One thousand Seven hundred and Seventy, referred it to the Committee to examine the Petition of Messieurs Adam and others, to the then Lord Mayor, praying Leave to apply to Parliament for a Bill for embanking a Part of the River Thames; they considered the Lines proposed, and having the Benefit of the River principally in View, altered the Proposition, and reported their Opinion, that an Embankment from the Angle near the York Buildings Fire Engine, in a strait Line to a Point in the said River, at the Distance of One hundred Feet from the Wharf at Salisbury Street, and from thence to the Bastion on the West Side of Somerset Stairs, would be of public Utility, as it would tend to improve the Navigation of that Part of the said River; but recommended Care to be taken to subject the Ground, gained out of the River by such Embankment, to the Payment of a Yearly Quit Rent, redeemable, and to be appropriated to the Fund for repairing, lighting, and watching the said Bridge. Which Report was ordered to be printed, and then referred back to the Committee to re-consider, together with several Memorials, complaining of the Encroachment made by the said Petitioners as a Nuisance, and praying

ing the Removal thereof. But the then Lord Mayor having, at the same Time, been requested to consult some Persons of Science upon the Subject, the Committee waited for the Benefit of their Opinions before they entered upon a Re-consideration of their own. His Lordship's Death prevented their being favoured with those Lights, and some short Time after they were discharged from proceeding any further.

This Embankment was, however, made by the Sanction of Parliament, not in the Lines above mentioned, nor yet subject to the Quit Rents which Messieurs Adam had consented to pay.

XXXVII.
Embankment
made by Sanc-
tion of Parlia-
ment.

The Works of the Bridge itself drew towards a Close; and the Mason and Carpenters having completely and honestly executed their Contracts, the same were delivered up to them, and ordered to be cancelled.

XXXVIII.
The Bridge
nearly finished.

In December, One thousand Seven hundred and Seventy, the Surveyor applied by a Memorial, as the Bridge was nearly finished, that a Stop should be put to his Subsistence Money; and that the Monies then due to him, on account of the Bridge, should be settled and paid. On which, after several Days Consideration, the Committee came to several Resolutions.

XXXIX.
Application of
Mr. Mylne to
stop his Sub-
sistence Money,
and to pay him
the Whole of
sundry Monies
due to him.

These (being Sixteen in Number) were to the Effect, that he was, on Account of his various Services, therein stated, entitled to a Commission of Five per Cent. on Works done, and a Commission of One per Cent. on Purchases made, being the same as were allowed at London Bridge, deducting therefrom the Sums he had received on that Account. By the last of these Resolutions he was thanked for the great Skill, Diligence, and Integrity, with which he had executed the several important Works entrusted to his Care.

XL.
Mr. Mylne, by
Resolutions of
the Committee,
entitled to sum-
dry Commis-
sions.

The Common Council, by virtue of the general Controul over the Powers granted to the Committee, brought this Subject before themselves; and an Application being by him made to that Court, they desired to know, whether he meant his Claim (of the Monies said to be due in virtue of the Opinion of the Committee) as a Matter of Right or Favour.

XLI.
Whether Mr.
Mylne's Claim
was a Matter
of Right or
Favour.

His Answer was, that he claimed it as a Right. A Case was then stated, by Order of the Court, very fully, and laid before the late Messrs Dunning, Wallace, Mr. Recorder, and Mr. Common Serjeant, who all concurred in Opinion, that he was entitled to the Monies so stated to be due. Whereupon the Court referred this Subject (which was Three Years depending) back to the Committee, to state the Account, and pay the Monies accordingly.

XLII.
Mr. Mylne's
Answer, to-
gether with the
Opinions of
Council.

All this while, the Business of embanking the River proceeded, but in a slow and progressive Manner. The Committee was under a Necessity

XLIII.
The slow Pro-
gress of em-
banking the
River.

Necessity of executing the Portions opposite the Gardens, and Property of the Two Temple Societies, as by Agreements with these learned Bodies, made in Parliament by the Members for the City, left them no Alternative; but which the Committee would have been very glad to have been excused fulfilling.

XLIV.
The Embankments completed.

These Works were, however, done, after a tedious and troublesome Progress, occasioned by a variety of Circumstances.

XLV.
Payment for the embanking obtained.

The Payment of these Works has been obtained, after long Solicitation, and the Monies stated to the embanking Fund.

XLVI.
Proprietors embarked their own Ground.

The greatest Part of the Proprietors within the Limits of that Undertaking, took the Option of embanking the Ground at their own Expense; and some of them took more than sufficient Time to perfect the same. The Lots of Ground in Front of the Remainder, were embanked by the Committee, and Quit Rents in proportion were exacted; therefore the Whole is now finished, and makes a pleasing uniform-strait Line, for Half a Mile in Extent, at right Angles with the Bridge, and forming the North Abutment exactly similar to the South, as was at first proposed.

XLVII.
Disputes of sundry Proprietors of Wharfs, &c.

Many Doubts, Difficulties, and Disputes, have arisen between the respective Proprietors and Occupiers of the Wharfs and Waterway in Front of the same: And it is no Wonder, as the Business was quite new in its Nature; and, had it not been for the good Sense and steady Impartiality of the Committee, they would not have been, as they now are, all settled and adjusted.

XLVIII.
Removal of public Stairs, Causeways, &c. Money ready to be invested.

The public Stairs, Causeways, and Common Sewers, were removed or lengthened out; and, after all, it is with some Satisfaction that it can be said there is now a Capital of £. 5,762. 17s. 4 $\frac{1}{2}$ d. invested, or to be invested, in the Public Funds, and an Annual Revenue of £. 45. 3s. 5 $\frac{1}{2}$ d. payable by various Parties as Quit Rents not yet purchased.

XLIX.
Introduction for making the new Roads.

Having stated the Origin and Progress of building the Bridge at Blackfriars, and also the Proposition for embanking the River, together with what relates to, or is connected with, the one or the other; it now remains to give a Detail of the various Proceedings, for making new Roads at the South End of the Bridge, and an Account of the Funds on which the same have been completed.

L.
Bridge completed. The Plan for forming the Roads dropped.

The Works of the Bridge done; the Affairs of it winding up; the great Street, called Bridge Street, with cross Communications connected therewith on the London Side; and the two Squares, called Chatham Place and Albion Place, at the Ends of the Bridge, being in a State of Formation; the Embankment in a State of Progress towards its Completion; the City of London bent the Whole of its Attention to that of making

making the Roads of Entrance from the South worthy of the Plans they had hitherto adopted, and were actually forming.

Various were the Propositions which were submitted to them at different Times; and, after being in some Measure agreed to, were dropped, on Account of powerful Oppositions made thereto when least suspected.

Two several Sessions of Parliament were fully occupied in discussing and sifting the Merits of those proposed, in which it was necessary to have a great many Meetings with the Trustees of the Surrey Turnpikes, and to encounter a Variety of contending Interests, hardly to be conceived.

L.I.
Delay of Parliament. Sundry Meetings with the Surrey Trustees about the Road.

To make a handsome Avenue through the County of Surrey, from the other Counties to the South and South West of this Metropolis, especially as it would prove a leading Line for all Strangers from the Continent, into the Capital of a great Empire, seemed in general the acting Principle; but still this was attempted, in the various Treaties, to be so directed as best suited some local Interests or Prejudices. Great and valuable Property lay directly in the Way, in a strait Line with the Bridge; for, after the Determination that the Bridge should be at Right Angles with the Stream, it was so placed, that the West Side of the Avenues, at both Ends of the Bridge, should just touch, and not interfere with the Ends of Christ Church Yard in Surrey, and Bridewell Chapel in London.

L.II.
Introduction of the Avenues from the Surrey Side.

The following great Points were held in View; First, a direct Way to St. Margaret's Hill, as the Center of Southwark, to accommodate that Quarter, and relieve London Bridge; the Second, a Line to Newington Butts, where all the Roads from the South met, as in a Center; and, Thirdly, a direct Line to Westminster Bridge, to communicate with all the Villages to the Westward, and to accommodate the City with a more short Way to the further Parts of Westminster, the Courts of Justice, Houses of Parliament, &c. than by the longer and incumbered Way of the Strand and Charing Cross. These Three great Lines were sometimes put in one Direction, and sometimes in another, according as the Objections arose, to avoid one Piece of Property, or to favour another, was most prevailing. The Committee, who conducted this Application to the Legislature, had great Patience, and deserve the Applause of Posterity, for the steady Manner in which, at last, we have seen they conducted this important Task, through such a Variety of combined Interests. It was at last found, the Subject was too complicated to be settled and ascertained at One Time, and by One Bill.

L.III.
Formation of the different Roads from the Surrey Side of the Bridge.

They threw off the Two Questions of the Side Branches to the Borough and to Westminster Bridge, and contented themselves with procuring an Act to make One Road in a Line with the Bridge itself, to a Spot on a Road then made, which was contrived, by the Plan adopted, to be the Center of all the Roads on that Side of the Water, useful to others as well as to this Proposition, by making also Two Branches,

L.IV.
Procured an Act for One middle Road to the Bridge and forming other Roads in Surrey.

one to Newington Butts, and the other in a Direction towards Lambeth. These, in some Measure, answer for Communications to the Borough and to Westminster Bridge, though in a round-about Way, compared to the others above-mentioned.

LV.
Plan of Roads
formed, and
Proposition of
levying a small
Toll.

Thus the Plan was laid; and as to the Funds for executing it, it was soon found, that so short a Distance as from the Foot of the Bridge to those old Roads, where these new proposed ones were to join, and where the Trustees had then a Power of levying the same Tolls as anywhere else, could not bear another small Toll, and, in Fact, that it would operate as a Toll on the Bridge, wherever the Gates for levying it should be placed within so short a Space. This was a serious Matter of Apprehension, the more especially as, if it was a small Toll, it would be permanent to defray the Expense of making a wide Road cross swampy Grounds, lower than the Surface of the Water in the Thames at High Water, and over Property, among whose Owners there seemed to be some who knew no Bounds to their Demands.

LVI.
Establishment
for defraying
the Expense of
making the
Surrey Roads
by the City of
London, upon
Conditions.

Viewing this Matter in this combined Light, it was at last established, that the City of London should make the Whole of the said Roads, and defray the Expense of making them complete; and that the Trust of the new Surrey Roads then subsisting, should light, watch, and repair the said Roads at all Times hereafter (unless the City should provide Funds for doing so); and that no Tolls should be exacted on the said Roads, nearer than the North Side of the Circus in St. George's Fields, nor more in Quantity than the Tolls they received at other of their then Gates; the Tickets of the one passing freely through all the others.

LVII.
Continuation
of the Tolls on
Blackfriar's
Bridge.

These Points were all settled by an Act, which passed in the Ninth Year of His present Majesty, Anno One thousand Seven hundred and Sixty-nine; and the City were enabled to defray the Expense of making the Roads so fixed, by a Continuation of the Tolls on the Bridge, which otherwise would have ceased and determined by the Act of the Year One thousand Seven hundred and Sixty-seven, for the general Purposes above-mentioned, and for paying the Sum of £.20,000. to the City of Westminster, granted towards new paving the Streets; and the Sum of £.12,000. to the Borough of Southwark, for the like Purposes.

This Narrative is, however, most humbly submitted by the Committee's most obedient, and very humble Servants,

Robert Mylne, Surveyor.

William Slade, Clerk.

Appendixes to (E. 1.)

ACCOUNTS RESPECTING THE BUILDING AND
COMPLETING BLACKFRIARS BRIDGE,

&c.

(N^o II.)—An ACCOUNT of the Money received and paid for building from Fleet Street, in the City of London, to the Upper-Ground S

				Dr.		
				£.	s.	d.
A Loan, raised in pursuance of the Act made for building the Bridge —				144,000	—	—
A Ditto, raised in pursuance of the Act made in the 7th of George the Third, for building and completing the Bridge — — —				58,500	—	—
The Net Produce of the Tolls, collected by Means of the temporary Bridge, and on the present Bridge, from the 19th of November 1766, to Michaelmas 1770, after deducting £.1,669. 9s. 9½d. the Expence of building the temporary Bridge, and of collecting the Tolls —				10,878	18	2
Interest of Money invested in the Public Funds, and Profit arising from the advanced Price of Stocks — — — — —				12,806	1	6
				£.	s.	d.
Cash by the Sale of old Materials — — — — —				1,194	11	—
Rent of Premises — — — — —				3,879	2	10½
Cash by the Sale of Ground Rents, which Ground was Part of those purchased with the Money belonging to this Fund — — — — —				9,967	15	—
				15,041	8	10½
The Net Produce of the Sheriffs Fines from Midsummer 1758, to Midsummer 1767 — — — — —				19,000	—	—
				260,226	8	6½
Balance overpaid the 31st of March 1784 — — — — —				1,352	12	—
				£.	261,579	— 6½

Blackfriars Bridge, and making the Avenues leading thereto,
County of Surrey, from the 16th of June 1759 to the 31st of March 1784.

Cr.

By Cash to Artificers for building and completing the Bridge, and making
certain Avenues leading thereto, viz.

	£.	s.	d.
To Joseph Dixon, Mason — — —	111,569	2	8½
To Dixon and Spencer, Carpenters — —	35,844	8	5
To Messrs. Cox and Co. — — —	10,687	16	7
To William Bryant, Blacksmith — —	3,555	11	4
To sundry other Artificers employed in said Works — — — — —	9,194	14	11½

£. s. d.
170,851 13 11½

By the Surveyor's Commission of £. 5. per Cent. on
Artificers Bills, and £. 1. per Cent. on the Pur-
chases and Sales of Premises — — —

9,130 1 —

By Five Years Salary for his constant Attendance
on the Meetings of the Committee, and for in-
specting and taking Care of the Bridge, Streets,
Roads, Sewers, new Buildings, and various Mat-
ters belonging thereto, from 1 June 1773, to
1 June 1778 — — — — —

525 — —

By Salaries and Gratuities paid the Clerks of the
Committee, from Midsummer 1758, to Michael-
mas 1778 — — — — —

1,683 2 6

By Ditto paid to Mr. Chamberlain's Clerks, for
keeping and stating the Accounts from Midsum-
mer 1760, to Christmas 1777 — — —

693 15 —

By Ditto and Gratuities paid to Mr. Hall-Keeper
and his Man, for summoning and attending the
Committee from Midsummer 1759, to Michael-
mas 1776 — — — — —

433 — —

12,464 18 6

By incidental Expenses — — — — —

4,507 8 8

By Interest paid on the Sum of £. 144,000. before it was transposed, and
charged to the Orphans Fund — — — — —

25,920 — —

By the Purchase of Ground and Premises — — — — —

35,584 1 11

By Cash to the Watermens Company, for the Purchase of the Sunday
Ferry — — — — —

12,250 17 6

£. 261,579 — 6½

F c

(N^o III.)—An ACCOUNT of the RECEIPTS and PAYMENTS of the EMBANKMENT, as unfolded, is, by the Act of the 7th of Geo. III. set apart for lighting, watching, cleaning,

		Dr.		
		£.	s.	d.
A Loan, raised in pursuance of the Act of the 7th Geo. III.	— —	7,500	—	—
Received from the Society of the Inner Temple, for making the Part in Front of their Premises	— — — —	1,150	—	—
Received from the Society of the Middle Temple for ditto	— —	410	—	—
Total of the Monies received to form the Embankment		£. 9,060	—	—
By Balance of Monies, remaining after the Embankment was completed		2,624	4	7
By Monies received, from the City of London; Lords Radnor and Wentworth; the Apothecaries and New River Companies; King's College, Cambridge; Messrs. Petiward, Smith, Norman, Morley, Martin, and others, for the Redemption of Quit Rents, in Front of their Wharfs, respectively	— — — — —	3,138	12	9½
Total of Monies ordered to be invested		£. 5,762	17	4½
By the Total Amount of Annual Quit Rents, from their Establishment respectively, previous to their Redemption, or down to Lady Day, 1784		255	5	5
By the Total Dividends for Monies invested in the Funds, to Lady Day, 1784	— — — — —	1,596	9	10
Amount of the whole Income to Light, &c.		1,851	15	3
By Balance of the Deficiencies in the Annual Fund or Estates for Lighting, &c. amounting to	— — — — —	2,847	9	3
		£. 4,699	4	6
Brought down the Deficiency above stated, wanted at this Time	— — — — —	£. 2,847	9	3
Which together with Monies in the Chamberlain's Hands	— — — — —	33	15	7½
Makes the Sum required by the Act to be invested in the Funds, as more particularly stated above; see the opposite Page		2,881	4	10½

the Residue of which, being put out at Interest, together with the Quit Rents
 arising BLACKFRIARS BRIDGE, viz. from September 28th, 1767, to Lady Day 1784.

Cr.

	£.	s.	d.
Paid to Artificers, for executing various Portions of the Embankment, including the Part in Front of the Temple Societies Premises, lengthening Sewers, rebuilding Stairs, &c. — — — — —	6,061	13	3
Ditto to Surveyor, his Commissions, Surveys, &c. — — — — —	319	9	—
Ditto for incidental Expenses, Law, Printing, &c. — — — — —	54	13	2
Total of Expense of forming the Embankment - -	6,435	15	5
By Balance of Money remaining after completing the whole Embankment, directed by the Act to be invested in the Public Funds — —	2,624	4	7
	£. 9,060	—	—
By the Purchase of £. 5,747. 2 s. 6 d. Bank 3 per Cent. Ann. Part of the Money directed to be invested — £. 5,000 — —			
Deduct, by the Sale of £. 1,000. of the said Ann. £. 856. 2 s. 6 d.; ditto, by the Sale of £. 2,200. more of said Ann. £. 1,262. 5 s. — — — — 2,118 7 6			
Money remaining in the Funds — —	2,881	12	6
By Balance remaining to be invested, agreeable to the Directions of the said Act, in order to make the Whole up to the Sum on the other Side —	2,881	4	10½
	£. 5,762	17	4½
By Monies paid for lighting the Bridge, from December 20, 1771, to Lady Day, 1783 — — — — —	1,984	18	11
By ditto for watching and cleaning ditto, from June 22, 1773, to December 31, 1783 — — — — —	974	17	6
By ditto in repairing the Gravel — — — — £. 626 7 8			
By ditto in general Repairs to the Bridge and Stairs, &c. — — — — 1,113 — 5			
	1,739	8	1
Amount of the Expense of Lighting, &c. &c. — — — — £.	4,699	4	6

(N^o IV.)—An ACCOUNT of the Money received and paid, in pursuance of the
BRIDGE, to and cross St. GEORGE'S FIELDS, from 15 June, 1769, to 25 March, 1784.

Dr.

	£.	s.	d.
The Balance remaining on the 26th of January, 1778, after the Debts chargeable by the Act of the 7th of Geo. III. on the Tolls collected on Blackfriars Bridge, &c. were discharged — — — —	657	14	6
Cash borrowed by Bond, in 1769, 1770, and 1771, on the Credit of the Tolls of Blackfriars Bridge, for making the said Road — —	26,000	—	—
Cash advanced by the Chamberlain — — — —	1,249	5	7½
Cash received by the Sale of old Materials — — — —	8	8	—
Cash received by the Sale of Premises, Part of these purchased out of the Monies of this Fund — — — —	1,759	1	—
The Produce of the Tolls collected on Blackfriars Bridge, and paid into the Chamber, from 26 January, 1778, to 25 March, 1784 — —	40,217	19	10
	£.	69,892	8 11½

made in the 9th Year GEO. III. for making ROADS from the South End of BLACKFRIARS

						Cr.		
						£.	s.	d.
By Interest on the Sum of £. 26,000, raised by Bonds, from 24 December, 1769, to Lady Day, 1784	—	—	—	—	—	13,485	—	—
By Discharge of the Debt for Interest due to the City, on the Sum of £. 7,298. 0 s. 4 d. advanced before the Tolls were applicable for making the said Roads, from 24 December, 1769, to 29 September, 1780	—	—	—	—	—	1,567	15	6
By the Purchase of Grounds and Premises	—	—	—	—	—	15,251	6	9½
By Carpenters, Bricklayers, Masons, and Smiths Works	—	—	—	—	—	5,039	6	3½
By the Expense of Rubbish to raise the Road	—	—	—	—	—	2,518	8	9
By Gravel laid upon the Road	—	—	—	—	—	2,280	—	10
By Law Charges, and other Expenses incurred in the Purchase of Premises	—	—	—	—	—	1,934	14	10
By the Surveyor's Commission of 5 per Cent. and 1 per Cent.	—	—	—	—	—	844	9	—
By Expenses of Juries, Fees for affixing the City Seal to Bonds, &c.	—	—	—	—	—	628	18	9
By Fees and Disbursements in obtaining the Act	—	—	—	—	—	519	9	4
By incidental Expenses	—	—	—	—	—	1,163	1	4
By Cash to Artificers for new Toll Houses and Gates, after the Riots in 1780, including the Surveyor's Commission	—	—	—	—	—	1,105	—	11
By the Expense of watering the Bridge, from the Beginning of the Summer, 1772, to the End of the Summer, 1783	—	—	—	—	—	659	7	—
By Salaries and Gratuities, viz.								
To Surveyor, for his constant Attendance on the Meetings of the Committee, and inspecting the various Matters respecting the Roads and new Buildings, from 1 June, 1778, to 1 June, 1783					525	—	—	
To Clerk of the Committee, from Michaelmas, 1770, to Lady Day, 1784	—	—	—	—	671	17	6	
To Mr. Chamberlain's Clerks, for managing the Accounts from Michaelmas, 1770, to Christmas, 1783	—	—	—	—	441	5	—	
To Gratuities to Mr. Hall-Keeper, for Attendance and summoning the Committee, from Midsummer, 1770, to Midsummer, 1783	—	—	—	—	204	10	—	
						1,842	12	6
By Discharge of Debt due to the Chamberlain	—	—	—	—	—	1,249	5	7½
By Discharge of Part of the Loan of £. 26,000	—	—	—	—	—	19,800	—	—
By Balance in Hand, 25 March, 1784	—	—	—	—	—	3	11	5½
						£. 69,892	8	11½

(No. V.)—An ACCOUNT and ESTIMATE of Monies due on Account of
BLACKFRIARS BRIDGE, &c. at Lady Day, 1784.

	£.	s.	d.
To Money, due to the Commissioners of the Pavements — —	1,259	18	8
To ditto, to Artificers, for Work done to Great Sewer — —	682	17	4
	£.	1,942	16 0
And			
To Works necessary to be done to the Bridge at this Time, as per particular Estimate thereof; see Appendix, No. VI. — —	2,500	0	0
	£.	4,442	16 0
Money due to the Embankment Fund, which was lately borrowed to pay Debts due on Account of lighting, watching, &c. the Bridge —	2,847	9	3
	£.	7,290	5 3

(No. VI.)—ESTIMATE of Works necessary to be done at this Time to BLACK-FRIARS BRIDGE, and the Works connected therewith, to put the Whole in proper and complete Order.

	£.	s.	d.
1st. Taking up and relaying many Stones in the Footways, which are grown uneven by unequal Settlements, making good Carriage Paving, &c. — — — — —	50	—	—
2d. Making Three new Watch Boxes complete, mending and painting Lamp Irons, Rails, and other Iron Work — — — — —	60	—	—
3d. Repairing Steps of the Four great Stairs, cutting out some Stones and inserting new Moor Stone for ditto, stopping Joints with Tarris Mortar, &c. mending Stone Work of Wings under the Stairs, stopping Joints, and putting in some new Stone — — — — —	200	—	—
4th. Repairing Kirbs of Four Causeways, clearing away the Mud, filling in Holes with Rubbish, and levelling Gravel, repairing Privies, &c. and placing some Piles at the Mouth of Fleet Ditch — — — — —	40	—	—
5th. Sinking the Well deeper, forming the Pump into a good and sufficient State for watering the Bridge in a permanent Manner — — — — —	50	—	—
6th. Laying a new Coat of Gravel on the Bridge and in Albion Place — — — — —	100	—	—
7th. Repairing the Face of the Stone Work of Eight Piers, from the Top of the Pedestals to Low Water Mark, by stopping the Joints and Holes with Tarris Mortar, cutting the Face of some of the Courses at the Pier-heads, which project improperly, making good some Stones which have dropped into the River, cutting out some bad Stones affected by severe Frosts, and making good the Whole, including Cramps, Lead, Floating Stages, Boats, &c. — — — — —	1,600	—	—
8th. Repairing the Soffits of Nine Arches, cutting out the Face of several bad Stones which have flushed in each Arch by the great Weight thereof, mending others near the springing, damaged by the large Craft navigating the River, including Hanging-stages, Boats, Tarris and Stone Mortar, &c. — — — — —	200	—	—
9th. Cleansing off the Dirt and Weeds from the great Cornice and Architraves, clearing out the Surface of Cross Joints, running the same with Lead, and stopping Holes, Incidents, &c. — — — — —	200	—	—
	£.	2,500	—

(No. V.)—An ACCOUNT and ESTIMATE of Monies due on Account of
BLACKFRIARS BRIDGE, &c. at Lady Day, 1784.

		£.	s.	d.
To Money, due to the Commissioners of the Pavements	— —	1,259	18	8
To ditto, to Artificers, for Work done to Great Sewer	— —	682	17	4
		£.	1,942	16 0
And				
To Works necessary to be done to the Bridge at this Time, as per particular Estimate thereof; see Appendix, No. VI.	— — —	2,500	0	0
		£.	4,442	16 0
Money due to the Embankment Fund, which was lately borrowed to pay Debts due on Account of lighting, watching, &c. the Bridge	—	2,847	9	3
		£.	7,290	5 3

(No. VI.)—ESTIMATE of Works necessary to be done at this Time to BLACK-FRIARS BRIDGE, and the Works connected therewith, to put the Whole in proper and complete Order.

	£.	s.	d.
1st. Taking up and relaying many Stones in the Footways, which are grown uneven by unequal Settlements, making good Carriage Paving, &c. — — — — —	50	—	—
2d. Making Three new Watch Boxes complete, mending and painting Lamp Irons, Rails, and other Iron Work — — — — —	60	—	—
3d. Repairing Steps of the Four great Stairs, cutting out some Stones and inserting new Moor Stone for ditto, stopping Joints with Tarris Mortar, &c. mending Stone Work of Wings under the Stairs, stopping Joints, and putting in some new Stone — — — — —	200	—	—
4th. Repairing Kirbs of Four Causeways, clearing away the Mud, filling in Holes with Rubbish, and levelling Gravel, repairing Privies, &c. and placing some Piles at the Mouth of Fleet Ditch — — — — —	40	—	—
5th. Sinking the Well deeper, forming the Pump into a good and sufficient State for watering the Bridge in a permanent Manner — — — — —	50	—	—
6th. Laying a new Coat of Gravel on the Bridge and in Albion Place — — — — —	100	—	—
7th. Repairing the Face of the Stone Work of Eight Piers, from the Top of the Pedestals to Low Water Mark, by stopping the Joints and Holes with Tarris Mortar, cutting the Face of some of the Courses at the Pier-heads, which project improperly, making good some Stones which have dropped into the River, cutting out some bad Stones affected by severe Frosts, and making good the Whole, including Cramps, Lead, Floating Stages, Boats, &c. — — — — —	1,600	—	—
8th. Repairing the Soffits of Nine Arches, cutting out the Face of several bad Stones which have flushed in each Arch by the great Weight thereof, mending others near the springing, damaged by the large Craft navigating the River, including Hanging-stages, Boats, Tarris and Stone Mortar, &c. — — — — —	200	—	—
9th. Cleansing off the Dirt and Weeds from the great Cornice and Architraves, clearing out the Surface of Cross Joints, running the same with Lead, and stopping Holes, Incidents, &c. — — — — —	200	—	—
	£.	2,500	—

(No. VII.)—An ACCOUNT of Funds for the Lighting, Watching, Cleansing, and Repairing BLACKFRIARS BRIDGE. Lady Day, 1784.

Arising out of the Embankment.				£.	s.	d.
1. Quit Rents payable by Mr. Kennet, for Ground embanked by the Committee	—	—	—	17	10	1½
Ditto by Fughlberg, for Ground embanked by himself	22	6	3			
Ditto by Hurford, for Ground embanked by the Committee	—	—	—	5	7	1½
						45 3 5½
2. By the Interest of £.2,881. 12s. 6d. invested in Bank Consols. 3 per Cent. per Ann.	—	—	—			76 5 3
* 3. By the Balance of £.2,847. 9s. 3d. the Capital Money due, which, when invested in the Funds according to the Act, will produce Annually about	—	—	—			142 10 —
4. By Use of Waterway, let to Mr. Baynes	—	—	—			20 0 —
				£.		283 18 8½
Arising out of the Remnants of Pieces of Ground bought for making the Streets, and granting Licences to inclose and build thereon, there are, or will be, as follows, viz.						
Ground let by Licence to John Cartwright, Esq.	—	—	—	15	6	6
Ditto to Elisha Biscoe, Esq.	—	—	—	12	9	3
						27 15 9
* Ground to be licensed to Mrs. Brown	—	—	—	2	18	0
* Ditto to the Dean and Chapter of Rochester, or their Tenants	—	—	—	9	4	2
						12 2 2
Vaults under the Street, let to Mr. Griffin	—	—	—	2	0	0
Ditto let to Mr. Lambden	—	—	—	1	0	0
						3 0 0
Of these Particulars, the Articles marked * are not productive at present, amounting to	—	—	—			326 16 7½
						154 12 2
There remains of course at present to watch, light, cleanse, and keep the Bridge in Repair, the small Sum of	—	—	—	£.		172 4 5½

(N^o VIII.)—ESTIMATE of the Annual Expense of Watching, Lighting, Cleansing, Watering, and Repairing BLACKFRIARS BRIDGE; which Particulars, except the Watering, are expressly ordered to be done by the present Acts of Parliament.

	£.	s.	d.
1st. Three Watchmen, One at each End of the Bridge, and One in the Middle, at 10s. 6d. per Week — — — — —	78	—	—
2d. Watch-house Fire, Lanthorns, and great Coats repaired — —	40	—	—
3d. Lighting 62 Lamps on the Bridge, and Wings thereof, at 28s. —	86	16	—
4th. One Labourer to cleanse the Bridge, and mend the Gravel, at 2s. per Day — — — — —	31	6	—
5th. Watering the Bridge, and 45 Yards at each End thereof, at —	65	—	—
6th. Repairs of Gravel on the Bridge, and in Albion Place, now both Sides are paved — — — — —	40	—	—
7th. Repairs of landing Places, Stairs, Causeways, Balustrades, Footways, Lamp Irons, Seats, Piers, &c. all these Parts being first put in proper Order — — — — —	80	—	—
8th. Annual Salary, to see these Articles performed, and also attend to all the Matters of Streets, Houses, &c. &c. — — — — —	50	—	—
9th. A Clerk for Proceedings, &c. &c. — — — — —	50	—	—
10th. Mr. Chamberlain's Clerks, for keeping Accounts, receiving and paying Monies, &c. — — — — —	12	—	—
11th. Hall-keeper for summoning Attendance, &c. — — — — —	6	—	—
12th. Incidents, Stationary, Advertisements, &c. — — — — —	60	—	—
	£.	599	2

Tho. Thorp,
Hen. Major,
Ja. Chapman,
Wm. Hallier,
Rob. French,
Cha. Aldridge,
John Clements,
T. Rigby,
Charles Wilkins,
W. Sharpe,
Wm. Newman,
Jere. Percy,
Ben. Bunn,
John Pinkorn,

James Esdaile,
Wm. Plomer,
Nath. Newnham,
John Hart,
Hen. Kitchen,
Wm. Hurford,
John Ellis,
Edw. Dowling,
G. Wilson,
Sylvanus Hall,
John Bailey,
Wm. Powell,
Wm. Wright.

G g

AND

AND a Motion being made, and Question put, that the said Report be printed under the Direction of the said Committee, and a Copy thereof sent to every Member of this Court, the same was resolved in the Affirmative.

R I X.

Appendix, (E. 2.)

FINAL REPORT to Common Council, on building and completing BLACKFRIARS BRIDGE, forming the EMBANKMENT, and making the new SURREY ROADS, &c. &c.—1786.

WRIGHT, Mayor. A Common Council, holden in the Chamber of the Guildhall of the City of London, on Friday the Twenty-fourth Day of February 1786.

THE Committee, for building and completing the Bridge at Blackfriars, did this Day deliver into this Court their final Report in Writing, under their Hands, which was read in these Words:

To the Right Honourable the Lord Mayor, Aldermen, and Commons, of the City of London, in Common Council assembled.

WE, whose Names are hereunto subscribed, of your Committee, to put in Execution the several Acts of Parliament, for building a Bridge at Blackfriars; for making Streets and Roads leading thereto; and for embanking the North Side of the River, &c.; beg Leave to report the Situation to which these several Works are brought, and the present State of the Accounts relating thereto.

Your Committee presented to this Honourable Court a long and special Report, dated the First Day of May 1784; and Two several Reports since that Time, of the 10th of February and 25th of October 1785.

To these, your Committee beg Leave to refer, for the varied State of their Affairs, at different Periods, from the Commencement of the Undertaking entrusted to them, down to the present Time.

The Account, relating to the building and completing the said Bridge, is closed; and the Balance thereof, £.302. 9s. 6d. has been carried to the Credit of the Fund for lighting, watching, and repairing the Bridge, &c.

Since the Date of the last Report, the Balance arising on the Toll Fund or Surrey Road Account, to wit, £.639. 3s. 10½d. has, under the Orders

Orders of this Honourable Court, been placed to the Credit of the said Fund, for lighting, watching, and repairing the Bridge; and all Demands on your Committee, of every Kind, have been paid off and discharged; save and except a Balance of £. 151. 12 s. 4 d. due to Mr. George Wyatt for Carpenter's Work, and £. 264. 7 s. 5 d. due to Mr. Thomas Clark for Bricklayer's Work; both done to the Great Sewer in Bridge Street; and save also, an Out-standing Claim, made by the Commissioners of Paving, &c. to the Amount of £. 1,259. 8 s. for new Pavements in Bridge Street, when the Avenue to the Bridge, on the London Side, was first laid open for the Use of the Inhabitants.

The Balance of the said Fund, for lighting, watching, and repairing the Bridge, &c. remaining in the Chamberlain's Hands on the 16th of January last, was £. 122. 4 s. 4 d.; and the Arrears due for Annual Rents, &c. amounted at Christmas last to £. 73. 4 s. 2½ d.

A Plan has been formed for lighting, watching, cleansing, and repairing the Bridge, in the most moderate Manner possible, at £. 174. per Annum, which Plan is now carrying into Execution, according to the Appendix, N° IV. And your Committee, in Conformity to the Order of this Court on the 22d of September last, have caused the additional Lamps to be replaced, and a new Coat of Gravel to be laid on the Bridge, at the Expense of the Corporation.

The Expenditure of the present Scheme is proceeding, with its Current Expenses; and there is no Fund provided for the watering the Bridge, when the proper Season of the Year may require it.—This Article of Expense is not mentioned in any of the Acts of Parliament.

Your Committee, on a former Occasion, submitted to the Consideration of this Honourable Court, that an Annual Revenue of £. 599. was absolutely necessary, to take proper Care of this Structure in future; and, as the Capital sold out of the Public Funds cannot be replaced, the Reasons mentioned on that Occasion, demonstrate the Necessity of providing an Addition to the present slender Income; which, from Experience, your Committee find quite inadequate to the Annual Expense of the Bridge.

The Bonds, issued to the Amount of £. 144,000. on Account of building the Bridge, have been transferred, under the Authority of Parliament, to another Security of a Duty on Coals, &c. under the Management of another Jurisdiction. The said Bonds are, in great Part, paid off; and the Remainder in a Train of being likewise discharged.

The Bonds, issued on the Surrey Road Account, to the Amount of £. 26,000. are all discharged and cancelled; so that the Whole of these different Undertakings, begun in the Year 1759, are now free of all Debts and Incumbrances, with the small Exceptions above set forth; and

and they now remain in the full Possession of the Public, without any Burthen, other than that of preserving the Bridge itself, the Landing Places, Causeways, Sewers, &c. in a State of proper Repair. For that Purpose, there is, at present, an Estate established, yielding about £. 175. per Annum. But, as the Estimate of such Expense is £. 599; the Deficiency, to be still provided, amounts to £. 424. per Annum.

Your Committee beg Leave to refer to the Appendixes, N^o I. II. and III. for a full State of their Accounts; the same being brought down to the present Time, from the Accounts stated in the Report made to this Honourable Court, on the 1st Day of May 1784.

What remains to be done in these Affairs, is most humbly submitted to the Wisdom of this Honourable Court.—Your Committee have it only in their Power to recapitulate, that the Sum of £. 415. 19s. 9d. is now necessary to be paid to the Workmen, Messrs. Wyatt and Clark; that the Works and Repairs, mentioned in the printed Report of the 1st of May 1784, to the Amount of £. 2,500. still remain to be done, except as to a few small Articles; and that an additional Provision of £. 424. per Annum, must yet be established, to take Care of this great Work for the future, in a decent and useful Manner, so as to render it of that Utility that the Public expect, and already experience.

These Particulars and Accounts have, in this Manner, brought down the Duty of your Committee to a Close; and, in respect of the making and erecting these Works, put a final Period to the Trusts which have been delegated by this Right Honourable Court.

Guildhall, February 13, 1786.

Sylvanus Hall,

Tho. Thorp,

Hen. Major,

G. Wilson,

Tho. Holdsworth,

William Pickett,

Wm. Newman,

John Ellis,

Wm. Hallier,

Ben. Bunn,

Wm. Powell,

James Chapman,

Rob. Pickwood,

AND a Motion being made, and Question put, that this Court doth empower the said Committee to draw on the Chamber of London, for any Sum, not exceeding £. 415. 19s. 9d. to enable the said Committee to discharge the Amount of Two Bills due to the Workmen, Messrs. George Wyatt and Thomas Clark, on Account of Work done to the great Sewer in Bridge Street (until such Time as a sufficient Fund is established for lighting, watching, cleansing, and repairing the said Bridge in future) the same was resolved in the Affirmative, and ordered accordingly.

ORDERED,

ORDERED,

That the said Report be printed under the Direction and Inspection of the said Committee, and a Copy thereof sent to every Member of this

Court.

R I X.

Hh

(N^o I.)—An ACCOUNT of Money received and paid, for building and com
the City of London, to the Upper Ground Street, in the County of Surrey, fr

							Dr.		
							£.	s.	d.
To rent of Premises	—	—	—	—	—	—	15	6	6
To the Consideration Money for License to build upon vacant Ground on the East Side of Bridge Street	—	—	—	—	—	—	1,639	15	—
							£.	1,655	1 6

(N^o II.)—An ACCOUNT of Money received and paid, in pursuance of a
BRIDGE, to and cross St. GEORGE'S FIELDS, from the 26th Day of March, 17

							Dr.		
							£.	s.	d.
To Balance of Cash remaining in Hand, in the Account ending the 25th of March, 1784, and presented to the Court of Common Council, the 14th of May following	—	—	—	—	—	—	3	11	5½
To the Produce of the Tolls collected on Blackfriars Bridge, and paid into the Chamber, from the 26th of March, 1784, to the 22d of June, 1785, at which Time the Toll ceased to be collected	—	—	—	—	—	—	7,723	13	8½
To Cash received by the Sale of the Toll Houses, Toll Gates, and some Iron Railing	—	—	—	—	—	—	150	7	3
							£.	7,877	12 5½

BLACKFRIARS BRIDGE, and making the Avenues leading thereto, from Fleet Street, in
Day of March, to the 18th Day of December, 1784.

Cr.

	£.	s.	d.
Balance overpaid in the Account (presented to the Court of Common Council, the 14th of May, 1784) ending the 31st of March, 1784 — — — — —	1,352	12	—
Balance of Cash in Hand, the 18th of December, 1784, and carried to the Account for lighting, watching, cleaning, and repairing Blackfriars Bridge — — — — —	302	9	6
	£.	1,655	1 6

in the 9th of GEO. III. for making Roads from the South End of BLACKFRIARS
27th Day of October, 1785.

Cr.

	£.	s.	d.
By Cash to Artificers, on Account of removing the Toll Houses, making good the Pavement, Road, &c. — — — — —	127	15	7
By Oil used in the Toll Houses — — — — —	55	17	4
By incidental Expenses, Advertisements, Law Charges, &c. — — — — —	153	4	6
By Salaries and Gratuities, viz.			
To Surveyor, for his constant Attendance on the Meetings of the Committee, and inspecting the various Matters respecting the Roads and new Buildings, from the 1st June, 1783, to the 24th June 1785 — — — — —	£. 216	12	4
To the Clerk of the Committee, from Lady Day, 1784, to Midsummer, 1785 — — — — —	62	10	—
To Mr. Chamberlain's Clerks, for managing the Accounts from Christmas, 1783, to Midsummer, 1785 — — — — —	30	—	—
To Gratuities to Mr. Hall-Keeper, for Attendance and summoning the Committee, from Midsummer, 1783, to the 12th July, 1785 — — — — —	20	17	6
	329	19	10
By Discharge of the Whole of the £. 26,000. — — — — —	6,200	—	—
By Interest on the Sum of £. 26,000. from Lady Day, 1784, to the 29th of November, 1785 — — — — —	371	11	4
By Balance of Cash remaining in Hand, the 27th of October, 1785, and transferred to the Account for lighting, watching, cleaning, and repairing Blackfriars Bridge, per Order of Common Council, the 27th of October, 1785 — — — — —	639	3	10½
	£.	7,877	12 5½

and, the Residue of which being put out at Interest, together with the Quit Rents
and repairing BLACKFRIARS BRIDGE, from the 26th of March 1784, to the 20th of

Cr.

	£.	s.	d.
By Money paid for repairing the Bridge and Avenues, and Work done to the great Sewer — — — — —	663	9	10
By ditto, for repairing the Gravel — — — — —	5	12	—
By ditto, for lighting the Bridge — — — — —	239	16	—
By ditto, for watching and cleaning the Bridge — — — — —	137	17	1
By ditto, for the Surveyor's Commission, &c. — — — — —	90	9	10
By ditto, for Incidents, Law Charges, Gratuities, &c. — — — — —	73	18	—
	<u>1,211</u>	<u>2</u>	<u>9</u>
Balance in Hand the 20th of January, 1786	122	4	— $\frac{1}{4}$
	<u>£. 1,333</u>	<u>6</u>	<u>9$\frac{1}{4}$</u>

(N^o IV.)—ESTIMATE of the lighting, watching, cleaning, and repairing BLACK-FRIARS BRIDGE, most consistent with the Public Service, and the Revenue at present established to answer these Purposes. 10th August, 1785.

	£.	s.	d.
1. To Two Watchmen to patrol the Bridge — — — —	62	8	—
2. To Great Coats, Hats, and Accoutrements for said Watchmen —	5	—	—
3. To the Charge of lighting 22 Lamps, at 28s. per Lamp — —	30	16	—
4. To a Labourer, to cleanse the Bridge, Causeways, &c. at 10s. 6d. per Week — — — — —	27	6	—
5. To watering the Bridge — — — — —			
6. To gravelling the Bridge. &c. — — — — —	25	—	—
7. To Repairs of Landing Places, Causeways, &c. Annually —			
8. To Annual Salary to Surveyor — — — — —			
9. To Annual Salary to Clerk — — — — —			
10. To ditto to Chamberlain's Clerks — — — — —			
11. To Hall-Keeper, for summoning Committee — — — —	6	—	—
12. To Incidents, Stationary, Advertisements, &c. — — — —	17	10	—
	£.	174	—

Appendixes (F. 1. 2. 3. & 4.)

ACCOUNTS

RESPECTING

LONDON BRIDGE WATER WORKS,

INCOME OF THE BRIDGE HOUSE ESTATES,

AND

THE ORPHANS FUND.

ABSTRACT of the Gross and Net Receipts of the Trustees of the LONDON

	1781.	1782.	1783.	1784.
	£. s. d.	£. s. d.	£. s. d.	£. s. d.
Net Rents for Service of Water -	8,568 6 7	8,592 4 2	8,795 16 8	9,058 8 8
Old Wood and Iron sold - - -	157 13 11	101 8 6	100 10 3	81 8 9
Gross Annual Income - - - -	8,726 0 6	8,693 12 8	8,896 6 11	9,139 17 5
Deduct Annual Expenditure - -	5,772 9 1	6,162 10 1	5,459 9 5	4,299 0 3
Net Annual Income - - - -	2,953 11 5	2,531 2 7	3,436 17 6	4,840 17 2

* Continued from p. 129.	1791.	1792.	1793.	1794.
	£. s. d.	£. s. d.	£. s. d.	£. s. d.
Net Rents for Service of Water -	9,574 19 5	9,623 15 9	9,655 12 4	9,756 11 2
Old Wood and Iron sold - - -	79 7 3	80 6 1	75 10 6	94 1 -
Gross Annual Income - - - -	9,654 6 8	9,704 1 10	9,731 2 10	9,850 12 2
Deduct Annual Expenditure - -	6,248 10 3	7,441 15 1	5,905 18 5	7,860 8 7
Net Annual Income - - - -	3,405 16 5	2,262 6 9	3,825 4 5	1,990 3 7

It is to be observed, that in the latter End of the Year 1779, all the Offices were con-
Steam Engine was erected, each of the Six Wheels was rebuilt, and the Works
No accurate Estimate therefore can be taken of the Income of the Company, but
very improved Plan, and not likely to require any extra Expenditure for the next T

(F. I.)

WATER WORKS, from May 1st, 1780, to May 1st, 1800; distinguishing each Year.

1785.	1786.	1787.	1788.	1789.	1790.
£. s. d. 9,225 10 9 82 — 3	£. s. d. 9,292 9 6 100 1 9	£. s. d. 9,389 13 4 101 10 10	£. s. d. 9,364 10 9 95 — 8	£. s. d. 9,495 11 3 77 4 8	£. s. d. 9,505 5 3 92 8 1
9,307 11 — 4,878 13 5	9,392 11 3 5,682 — 9	9,491 4 2 6,438 4 7	9,459 11 5 7,031 13 3	9,572 15 11 6,226 12 4	9,597 13 4 6,410 1 2
4,428 17 7	3,710 10 6	3,052 19 7	2,427 18 2	3,346 3 7	3,187 12 2

Continued at p. 128. *

1795.	1796.	1797.	1798.	1799.	1800.
£. s. d. 9,720 8 7 85 7 8	£. s. d. 9,699 9 6 81 19 4	£. s. d. 9,767 6 11 95 5 11	£. s. d. 9,851 12 10 100 6 3	£. s. d. 9,892 17 5 115 9 —	Not yet made up.
9,805 16 3 5,027 11 4	9,781 8 10 7,056 13 10	9,862 12 10 5,442 10 8	9,951 19 1 4,803 16 5	10,008 6 5 4,983 15 7	
4,778 4 11	2,724 15 —	4,420 2 2	5,148 2 8	5,024 10 10	

by Fire, and Part of the Works damaged; and that in the Period from 1785 to 1797, a new completely repaired, which occasioned an extra Expenditure of Twenty Thousand Pounds. the Average of the Three last Years. The Works are now all in good Repair, upon a Years.

Richard Till, Secretary,
London Bridge Water Works,
May 7th, 1800.

ABSTRACT of the EXPENDITURE of the Trustees of the LONDON BR

	1781.	1782.	1783.	1784.
	£. s. d.	£. s. d.	£. s. d.	£. s. d.
Allowance to Board of Managers -	245 — —	256 10 —	204 — —	185 — —
Petty Expenses - - - - -	31 14 7	33 9 10	45 7 4	35 5 —
Repairs - - - - -	173 6 10	324 19 —	71 16 11	70 12 —
Masons Work - - - - -	78 8 —	74 16 5	90 6 10	56 16 8
Timber - - - - -	83 17 —	85 6 8	105 8 —	77 7 6
Servants Wages - - - - -	1,182 1 8	1,262 12 6	1,227 3 1	1,308 17 5
New Buildings after the Fire - -	660 11 9	320 9 —		
Elm Pipes - - - - -	714 14 —	733 2 —	717 13 3	454 4 —
Iron-founders Work - - - - -	267 — —	50 17 —	57 2 —	81 10 —
Brass-founders Work - - - - -	69 13 —	36 5 —	15 10 —	67 — —
Smiths Work - - - - -	130 17 —	216 18 —	176 18 —	256 10 —
Rent to the City of London - - -	211 10 8	105 15 4	105 15 4	105 15 4
Plumbers Work - - - - -	97 6 3	86 3 10	66 19 6	41 16 5
Paviors Work - - - - -	467 16 4	971 4 11	1,129 6 11	314 19 6
Horse-keeping - - - - -	67 11 1	39 1 —	32 4 —	43 10 6
Steam Engine - - - - -	190 10 1	200 6 8	284 16 4	129 8 7
Taxes on the Works - - - - -	625 10 10	738 19 1	699 15 7	543 8 3
Stores of various Sorts - - - - -	426 15 10	475 10 —	284 8 9	310 1 1
Gratuities - - - - -	46 17 6	98 18 —	70 16 —	67 1 6
Leasehold Estates - - - - -	1 6 8	51 5 10	42 16 7	34 9 6
Law Suit - - - - -	— — —	— — —	— — —	129 2 —
Interest for Money borrowed - -	— — —	— — —	31 5 —	6 5 —
£.	5,772 9 1	6,162 10 1	5,459 9 5	4,299 — 3

pen

F. 2.)

N Br

WATER WORKS, from May 1st, 1780, to May 1st, 1800; distinguishing each Year.

1785.	1786.	1787.	1788.	1789.	1790.
£. s. d. 184 10 —	£. s. d. 183 — —	£. s. d. 189 10 —	£. s. d. 192 — —	£. s. d. 193 — —	£. s. d. 197 10 —
31 10 4	42 2 1	51 10 11	36 15 2	54 2 2	58 11 1
124 18 —	146 15 6	346 9 —	172 2 —	168 8 —	11 2 8
56 10 10	87 2 6	52 14 9	62 2 3	46 15 10	55 16 6
192 7 6	52 13 —	571 10 11	162 2 —	395 4 —	275 2 6
1,253 7 10	1,329 1 3	1,770 — 11	1,365 12 4	1,880 18 4	1,905 6 9
628 13 —	777 9 —	705 14 —	860 1 —	613 12 —	717 1 —
79 17 —	54 — —	150 3 —	46 18 —	93 9 —	172 8 —
115 16 —	71 15 —	48 2 —	47 3 —	89 8 6	86 1 —
162 5 —	128 4 —	500 15 6	141 15 —	340 3 6	488 3 —
105 15 4	105 15 4	105 15 4	105 15 4	105 15 4	105 15 4
27 4 5	66 18 —	83 6 8	31 3 11	41 1 6	85 15 7
359 17 11	320 16 3	344 9 3	378 15 3	349 16 1	354 2 3
35 11 6	42 5 —	33 7 6	42 11 —	51 10 6	40 16 11
182 — 2	931 4 1	302 14 4	2,016 5 2	197 10 5	361 7 1
650 — —	601 16 7	598 3 9	597 11 11	602 9 3	637 7 4
569 14 9	592 8 7	431 7 2	603 17 7	780 16 6	606 5 8
83 7 —	91 15 —	91 16 —	111 16 —	136 7 6	107 10 —
35 6 10	56 19 7	42 7 4	44 15 4	58 — 10	52 11 5
— —	— —	18 6 3	12 10 —	28 3 1	91 7 1
4,878 13 5	5,682 — 9	6,438 4 7	7,031 13 3	6,226 12 4	6,410 1 2

Continued on the next Page.

<i>Continued from p. p. 130 & 131.</i>	1791.	1792.	1793.	1794.
	£. s. d.	£. s. d.	£. s. d.	£. s. d.
Allowance to Board of Managers -	186 — —	187 — —	201 10 —	203 — —
Petty Expenses - - - - -	33 5 2	39 19 11	46 — 2	40 3 9
Repairs - - - - -	219 2 —	354 13 6	154 7 6	378 4 6
Masons Work - - - - -	71 12 11	126 19 3	62 8 4	75 14 1
Timber - - - - -	617 15 4	604 3 —	551 5 —	503 14 —
Servants Wages - - - - -	1,789 13 7	2,285 11 —	1,552 3 8	2,666 15 —
Elm Pipes - - - - -	678 8 —	656 4 0	676 11 —	588 13 —
Iron-founders Work - - - -	233 13 —	581 3 —	185 3 —	251 6 11
Brass-founders Work - - - -	60 7 —	146 15 6	48 11 —	56 — —
Smiths Work - - - - -	216 11 —	541 15 —	226 1 —	452 3 —
Rent to the City of London - -	105 15 4	105 15 4	105 15 4	105 15 4
Plumbers Work - - - - -	29 15 2	74 2 —	75 14 6	28 3 6
Paviors Work - - - - -	355 8 4	342 4 2	255 7 5	493 17 8
Horse-keeping - - - - -	40 — 6	58 9 —	49 4 4	54 9 6
Steam Engine - - - - -	143 2 2	94 — 3	225 2 10	288 7 7
Taxes on the Works - - - -	639 16 2	600 3 6	594 1 —	608 5 10
Stores of various Sorts - - - -	593 19 4	354 6 2	557 18 1	614 9 8
Gratuities - - - - -	71 10 —	87 3 —	45 3 —	98 14 —
Leasehold Estates - - - - -	42 12 4	48 17 7	38 2 8	54 4 6
Interest for Money borrowed - -	120 2 11	152 9 11	255 8 7	298 6 9
£.	6,248 10 3	7,441 15 1	5,905 18 5	7,860 8 7

1795.	1796.	1797.	1798.	1799.	1800.
£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.	
198 — —	198 10 —	207 — —	207 10 —	211 10 —	Not yet made up.
57 18 7	44 7 10	52 5 4	46 10 2	52 19 6	
3 11 6	47 15 6	139 3 —	68 13 —	105 12 —	
88 3 11	56 17 7	88 15 2	57 — —	50 3 11	
42 15 —	1,100 4 —	252 12 —	94 9 —	85 3 4	
1,569 14 9	2,510 18 4	1,710 8 11	1,632 18 —	1,820 10 8	
568 16 —	554 11 6	637 6 —	630 13 —	584 7 —	
99 8 —	148 14 4	160 17 —	264 2 —	128 16 —	
3 13 —	18 18 8	33 8 6	11 5 —	28 18 —	
93 8 —	376 2 —	183 16 6	120 3 —	97 19 —	
105 15 4	105 16 4	105 16 4	105 16 4	105 16 4	
101 16 6	65 6 7	90 5 7	69 11 5	65 3 11	
354 5 —	296 8 5	367 1 6	343 19 —	271 4 4	
53 14 6	63 19 —	56 8 —	48 11 6	60 15 —	
233 8 6	217 15 6	171 12 8	126 3 1	192 11 6	
587 10 1	110 18 5	318 — —	414 19 8	356 5 10	
441 18 7	780 1 2	617 11 5	418 19 2	586 18 9	
93 9 —	93 15 —	36 — —	46 10 —	141 — —	
42 2 —	40 12 8	34 12 —	37 11 2	38 — 6	
288 3 1	225 1 —	179 10 9	58 11 11		
5,027 11 4	7,056 13 10	5,442 10 8	4,803 16 5	4,983 15 7	

Appendix (F. 3.)

AN ACCOUNT of the Net Income of the BRIDGE HOUSE ESTATES for Five Years, ending at Christmas 1799; distinguishing the respective Amount of the Rents, Dividends, Fines, and other Articles, constituting the said Income.

ACCOUNT ending at Christmas 1795 :							£.	s.	d.	
Rents	—	—	—	—	—	—	7,408	17	3	
Quit Rents	—	—	—	—	—	—	6	9	9½	
Received from the Chamber of London on Account of Cash borrowed	—	—	—	—	—	—	6,887	10	—	
Dividends on Three per Cent. Bank Annuities	—	—	—	—	—	—	1,500	—	—	
							15,802	17	—½	
Disbursements	—	—	—	—	—	—	16,757	4	8½	
ACCOUNT ending at Christmas 1796 :										
Rents	—	—	—	—	—	—	8,319	4	8½	
Quit Rents	—	—	—	—	—	—	6	7	5	
Fines for Leases	—	—	—	—	—	—	70	—	—	
Dividends on Three per Cent. Bank Annuities	—	—	—	—	—	—	1,350	—	—	
Casual Receipts	—	—	—	—	—	—	26	10	—	
							9,772	2	1½	
Disbursements	—	—	—	—	—	—	9,584	17	10	
										187 4 3½
ACCOUNT ending at Christmas 1797 :										
Rents	—	—	—	—	—	—	8,701	13	2½	
Quit Rents	—	—	—	—	—	—	21	13	7½	
Fines for Leases	—	—	—	—	—	—	30	—	—	
Dividends on Three per Cent. Bank Annuities	—	—	—	—	—	—	1,650	—	—	
Casual Receipts	—	—	—	—	—	—	44	4	8	
							10,447	11	6	
Disbursements	—	—	—	—	—	—	8,225	17	1	
										2,221 14 5

ACCOUNT ending at Christmas 1798:

	£.	s.	d.	
Rents — — — — —	8,295	—	8	
Quit Rents — — — — —	8	6	11	
Dividends on Three per Cent. Bank Annuities —	1,500	—	—	
To the Produce of Three per Cent. Bank Annuities fold — — — — —	4,774	10	—	
	14,577	17	7	
Disbursements — — — — —	13,342	8	6½	
				1,235 9 —½

ACCOUNT ending at Christmas 1799:

	£.	s.	d.	
Rents — — — — —	9,149	2	4½	
Quit Rents — — — — —	6	6	11	
Dividends on Three per Cent. Bank Annuities —	1,500	—	—	
Casual Receipts — — — — —	142	3	7	
	10,797	12	10½	
Disbursements — — — — —	10,593	12	4½	
				204 — 6½

Gab^l Leekey,

E. Colebatch,

Jacob Cope,

Tho^s Marriot,

Jⁿ^o Ord.

Appendix (E. 4.)

A STATEMENT of the ORPHANS FUND, in order to shew by what Time the present Orphans Debt, amounting to £.825,800. on the 5th Day of July 1800, will be paid off; and provided a further Sum of £.200,000. at £.5 per Cent. should be charged thereon, what Effect the said Charge would have on the Fund.

The Amount of the Duties and Impositions which at present compose the Fund, on an Average of Seven Years ending 5th July 1799	—	—	—	—	—	£.	s.	d.
						49,157	18	2
From the above Gross Average, deduct the Annual Outgoings chargeable on the Fund, viz.								
The Year's Interest on £.437,000. Orphans Stock, at £.4. per Cent. per Ann.	—	—	—	—	—	17,480	—	—
D° - - - on £.156,000 at £.3½ per Cent. per Ann. -						5,460	—	—
D° - - - on 93,800 at 4½ per Cent. per Ann. -						4,221	—	—
D° - - - on 100,000 at 5 per Cent. per Ann. -						5,000	—	—
D° - - - on 9,000 at D° — — —						450	—	—
D° - - - on 30,000 at D° — — —						1,500	—	—
D° - - - on 60,000 at D° — — —						3,000	—	—
Charges of Management	—	—	—	—	—	786	—	7
						37,897	—	7
And the Remainder will be the Surplus applicable to discharge the Principal	—	—	—	—	—	11,260	17	7

This Surplus of £.11,260. 17 s. 7 d. being Yearly applied in Discharge of the Principal, will, with the Savings of Interest thereon (and discontinuing the Interest on the Loan of £.60,000. raised on the Credit of the Money to arise by the Sale of Ground, &c. at Temple Bar and Snow Hill, for Five Years, from 5th July 1799) in Thirty-one Years and a Quarter, from 5th July 1800, viz. by Michaelmas 1831, pay off the above Debt of £.825,800. which is the Time the Sixpenny Duty on Coals, and the Annual Charge of £.11,500. on the City's Estate, will expire.

But should the Sum of £.200,000. at £.5 per Cent. be charged on the Fund, it would, by the above Diminution of the Revenue at Michaelmas 1831, viz. the Sixpenny Duty on Coals, and the Annual Charge on the City's Estate, amounting together to the Sum of £.32,314. reduce the Income of the Fund to £.16,843. 18 s. 2 d. which is £.18,463. 1 s. 10 d. short of the several Sums chargeable thereon at that Period, as will appear by the following Statement:

AMOUNT

AMOUNT of the several Duties and Impositions which will compose the Fund at Michaelmas 1831, provided they should produce the same as they have on an Average of Seven Years, ending 5th July 1799 -

Deficiency being less than the Outgoings — —

£. s. d.

16,843 18 2

18,463 1 10

£. s. d.

35,307 — —

Amount of the Annual Outgoings, which will be chargeable on the Fund at the above Period :

The Year's Interest on £. 216,900. Orphans Stock, at £. 4 per Cent. per Ann. — — —

8,676 — —

D° - - - on £. 156,000 in Bonds at £. 3½ per Cent.

5,460 — —

D° - - - on 93,000 D° at 4½ per Cent.

4,221 — —

D° - - - on 100,000 D° at 5 per Cent. -

5,000 — —

D° - - - on 9,000 D° at D° — —

450 — —

D° - - - on 30,000 D° at D° — —

1,500 — —

D° - - - on 200,000 D° at D° — —

10,000 — —

35,307 — —

By the foregoing Statement, it appears that the Sum of £. 200,000. cannot be charged on the Orphans Fund, without an Extension of the present Duties and Impositions which compose the Fund. But should the Sixpenny Duty on Coals be continued after Michaelmas 1831, when the Charge on the City's Estate will cease, it will then be Sixty-eight Years and an Half from Michaelmas 1831 viz. Lady Day 1900, before the Whole of the augmented Debt will be paid off.

Presented by, T. Tyrrell.

Appendix (G.)

REPORT on the Effect of Deepening and Embanking the River Thames; addressed by Mr. JESSOP to Mr. DANCE.

Sir,

YOU have asked me, what, in my Opinion, should be the Contraction of the Width of the River between London and Blackfriars Bridges, if the former were to be taken down and rebuilt, and the River were to be sufficiently deepened to admit Ships of a moderate Burthen between the Two Bridges; and so as to maintain such acquired Depth?

I will not undertake to give you a very correct Opinion on the Subject; if I were capable of doing so, it would require a Variety of Observations and Experiments to obtain Data on which to found such an Opinion, and would take more Time than I should be at Liberty at present to devote to it; but it appeared in some Degree necessary to ascertain the Velocities of the Current of a flowing Tide; and though it may give but little Information essential to the Object of your Enquiry, I will take the Liberty of reciting the Result of this Experiment, though made under your Inspection, rather as a Record which may lead to future Investigation, than as material to the present Question.

In looking at the Plan of the River, it appeared that the Part of it opposite to the Steel Yard, as being far enough above the Bridge to be undisturbed by the irregular Motion of the Water caused by the Obstructions at the Bridge, and where its Width is nearly a Mean between the wider and narrower Parts, might be a proper Situation to make an Experiment.

As the Velocities of the Current are different in the Middle and toward the Shores of the River, Three Boats were moored, One on each Side at the Distance of 100 Feet from Low Water Mark, and One in the Middle between them; Two Persons were stationed in each Boat, One at the Head with a Stop Watch, to observe when a floating Body passed by the Head, another to call out when the Body passed the Stern. The Floats made use of were Turnips and Potatoes, connected together by a String about a Yard in Length; the one being specifically lighter than Water, the other heavier, and sufficiently so as to immerse the Turnip without sinking it, but to prevent its being affected by the Wind.

The Observations were made from the Time of Flood, or Low Water above Bridge, to the Time of Still Water (which is about 45 Minutes after High Water) at the End of every Ten Minutes. It was intended to have noticed the Rise of Tide also in every Ten Minutes, but this, by Mistake, was omitted.

The

The Day of Observation was the 5th of October, when, from the Position of the Moon, the Tide should have been a High One; but, from the Direction of the Wind, it was little more than a moderate Spring Tide.

The Boats were 21 Feet in Length. The following Table shews, in the First Column, the Times of each Observation; and in the Three other Columns the Time, in Seconds, in which the Floats moved with the Water the Length of 21 Feet:

Time of the Day.		London Shore.	Middle of River.	Surrey Shore.	
Hours.	Minutes.	Seconds.	Seconds.	Seconds.	
11	26	- - -	- - -	- - -	Flood or Low Water.
11	45	- - -	- - -	- - -	Still Water.
12	—	19"	23" $\frac{1}{2}$	20	
12	10	13	10	25	
12	20	11	6	15	
12	30	9	5 $\frac{1}{2}$	12	
12	40	9	5 $\frac{1}{2}$	10	
12	50	8	5 $\frac{1}{2}$	10	
1	—	7	6	10	
1	10	6	4 $\frac{3}{4}$	9	
1	20	6	5	8	
1	30	6	4 $\frac{1}{2}$	7	
1	40	5 $\frac{1}{2}$	4	7 $\frac{1}{2}$	
1	50	5	4	6 $\frac{1}{2}$	
2	—	5	4 $\frac{1}{2}$	6	
2	10	6	4	6	
2	20	6	4 $\frac{1}{2}$	6 $\frac{1}{2}$	
2	30	6	5	6	
2	40	6	4 $\frac{3}{4}$	6	
2	50	7	5	6	
3	—	7	4 $\frac{1}{2}$	6	
3	10	6	4 $\frac{1}{2}$	7	
3	20	7	4 $\frac{3}{4}$	7 $\frac{1}{2}$	
3	30	8	4 $\frac{3}{4}$	8	
3	40	8	6 $\frac{1}{2}$	9	
3	45	- - -	- - -	- - -	High Water.
3	50	10	6 $\frac{1}{2}$	9	
4	—	11	10 $\frac{1}{2}$	15	
4	10	21	14 $\frac{1}{2}$	22 $\frac{1}{2}$	
4	20	- - -	- - -	- - -	Still Water.

From the above it appears, that the greatest Velocity, at a Mean deduced from the Three Observers, was 21 Feet in 5" $\frac{17}{100}$, or at the Rate of 2 Miles $\frac{1}{4}$ in the Hour; that the Mean Velocity, from all the Observations

vations near the London Shore was 21 Feet in $8\frac{4}{10}$; in the Middle of the River 21 Feet in $6\frac{2}{10}$; near the Surrey Shore 21 Feet in $9\frac{3}{10}$; and the Mean Velocity, from the Whole of the Observations, was 21 Feet in $8\frac{7}{10}$, or at the Rate of One Mile and $\frac{1}{4}$ per Hour.

From the Plan and Soundings of the River, taken by Order of the Trinity House, and annexed to the Second Report of the Committee for the Improvement of the Port of London (1799) the Depths in the Channel at Low Water below London Bridge, are from 10 to 16 Feet; the Soundings above Bridge at Low Water are from 6 to 10 Feet; but as the Obstruction at the Bridge causes a Fall of Three Feet or more, if the Bridge were removed, the Depth above Bridge would be so much reduced.

Not knowing precisely what the Size of Vessels should be which are meant to be accommodated, I have assumed a Depth of 13 Feet at Low Water in the Middle of the River, and about 10 Feet at the Sides, to admit a little Curvature in the transverse Section of the Bottom.

As the Quantity of Matter taken out to obtain such Depth would cause a considerable Decrease of Velocity in the Current, and, for Want of Velocity, Matter would in a few Years again be deposited, until the Depth would again be as deficient, it becomes absolutely necessary to contract the Width in such Proportion to the Increase of Depth, as to maintain nearly the same Velocity of the Current as it has in its present State, and to make Room for receiving the Matter taken out by so increasing the Depth of the River.

Appendix.
Plate XX.

The Calculation on which this Reduction of Width is founded, has Reference to the Section opposite the Steel Yard, on the Assumption that what may be proper at this Part of the River, may be nearly so in any other Part between the Bridges; for although, upward, the River is considerably wider, yet as it is proportionally shallower, the greater Quantity of Matter to be excavated will require the greater Quantity of Room for receiving it.

The present Width of the River at High Water opposite to the Steel Yard is 770 Feet; to leave the same Capacity in its Section after being deepened, and to preserve the same Mean Velocity, considering it only as a Channel for the Conveyance of Water, it would require that it should be so contracted that at most its Width should not exceed 500 Feet, as shewn by the dotted lines A B, in the annexed Section; but considering it also as a Receptacle for Shipping, it will admit of a greater Width.

On the Supposition that Tiers of Five Ships in Width may moor on each Side of the River, and that the average Section of each Ship, or of the Part of it immersed, may be equal to a Parallelogram of 20 Feet in Width by 10 Feet in Depth, the 10 Ships will create an Obstruction equal to a Section of 2000 Square Feet in Area; and to provide for this, leaving the necessary Capacity in the River, would demand an Addition of 60 Feet to the Width above mentioned, amounting to 560 Feet.

But

But as the Capacity of its Section has been measured from High Water, and it is obvious that at Low Water, when the Vessels would nearly touch the Ground, the Section would be too much diminished; and considering also, that when the Obstruction at the Bridge would be removed, a greater Quantity of Water would flow up the River than heretofore; it may, probably, require that the Width should be 600 Feet*: and I am of Opinion, this should not be exceeded, from a Belief that a greater Width would not preserve a sufficient Velocity to maintain its Depth, and that it would not afford sufficient Room in the Embankments to receive the Matter excavated from the Bottom.

As the Width of the River at and above Blackfriars Bridge greatly exceeds the Width above mentioned, it would not be proper that the Embankment should have an abrupt Termination; I have, therefore, supposed that the Contraction to 600 Feet should not extend further up than Broken Wharf, from whence it may be gradually reconciled with the greater Width above, leaving the whole Front of Blackfriars Bridge unaffected.

This gradual Increase of Width must necessarily be accompanied by the gradual Decrease of Depth, as well because more Depth would not be maintained, as because it might affect the Foundations of the Piers of Blackfriars Bridge.

From the Point where the intended New Bridge may be erected, or rather from higher up the River, the Width may be increased from 600 to 700 Feet below the present Bridge, so as gradually to reconcile it with the greater Width below; as, from the greater Quantity of flowing and ebbing Water, and on the Supposition that a greater Quantity of Shipping will lye below Bridge than above, the Increase of Width in this Part may not materially affect the Depth.

Sir,

Your very humble Servant,

W. Jessop.

* If the Depth were to be 12 Feet instead of 13, it would save about £.4000 in the Expense of Excavation, and would admit of the River being 24 Feet more in Width.

It may here be observed, that in any Sections of a River of equal Area, the One which is narrow and deep will discharge more Water than that which is wide and shallow.

The COMMITTEE have subjoined, by way of Supplement, Two PLANS, which were offered to them too late to be noticed in the Body of their Report. The first of them is a Design, by Mr. JAMES BLACK, of a Bridge of Three Arches, of Scotch Granite:—The other, by Messrs. TELFORD and DOUGLASS, of an Iron Bridge, in a single Arch of 600 Feet Span. The Construction of each of them will be sufficiently explained by the Descriptions and Designs annexed.

CONTENTS OF THE SUPPLEMENT.

Appendix.		Page.
(H.)	Report of Mr. JAMES BLACK, on the Building of a Stone Bridge of Three Arches - - - - -	143 & Plates XXII and XXIII.
(I.)	Estimate and Plan for a Bridge, as proposed by Messrs. TELFORD and DOUGLASS, consisting of a single Arch of Cast Iron, 600 Feet Span - - - - -	148 & Plate XXIV.

SUPPLEMENTAL PLANS.

Mr. BLACK's Designs ; *viz.*

- | | |
|---|--------------|
| (A.) Profile of a Bridge, proposed to be built of Granite, over the River Thames,
from St. Saviour's in Southwark, to or near the Old Swan, London - - - | Plate XXII. |
| (B.) A Section of the Centres and Masonry of Granite of a Bridge, as above - - - | Plate XXIII. |

Messrs. TELFORD and DOUGLASS's additional Design ; <i>viz.</i> for a Cast Iron Bridge, of a single Arch, 600 Feet in the Span - - - - -	Plate XXIV.
--	-------------

CONTENTS OF THE SUPPLEMENT

Page	
100	Report of the Committee on the Education of the Deaf
101	Report of the Committee on the Education of the Deaf
102	Report of the Committee on the Education of the Deaf
103	Report of the Committee on the Education of the Deaf
104	Report of the Committee on the Education of the Deaf
105	Report of the Committee on the Education of the Deaf
106	Report of the Committee on the Education of the Deaf
107	Report of the Committee on the Education of the Deaf
108	Report of the Committee on the Education of the Deaf
109	Report of the Committee on the Education of the Deaf
110	Report of the Committee on the Education of the Deaf
111	Report of the Committee on the Education of the Deaf
112	Report of the Committee on the Education of the Deaf
113	Report of the Committee on the Education of the Deaf
114	Report of the Committee on the Education of the Deaf
115	Report of the Committee on the Education of the Deaf
116	Report of the Committee on the Education of the Deaf
117	Report of the Committee on the Education of the Deaf
118	Report of the Committee on the Education of the Deaf
119	Report of the Committee on the Education of the Deaf
120	Report of the Committee on the Education of the Deaf

SUPPLEMENTAL TABLE

Page	
121	Report of the Committee on the Education of the Deaf
122	Report of the Committee on the Education of the Deaf
123	Report of the Committee on the Education of the Deaf
124	Report of the Committee on the Education of the Deaf
125	Report of the Committee on the Education of the Deaf
126	Report of the Committee on the Education of the Deaf
127	Report of the Committee on the Education of the Deaf
128	Report of the Committee on the Education of the Deaf
129	Report of the Committee on the Education of the Deaf
130	Report of the Committee on the Education of the Deaf
131	Report of the Committee on the Education of the Deaf
132	Report of the Committee on the Education of the Deaf
133	Report of the Committee on the Education of the Deaf
134	Report of the Committee on the Education of the Deaf
135	Report of the Committee on the Education of the Deaf
136	Report of the Committee on the Education of the Deaf
137	Report of the Committee on the Education of the Deaf
138	Report of the Committee on the Education of the Deaf
139	Report of the Committee on the Education of the Deaf
140	Report of the Committee on the Education of the Deaf

Appendix (H.)

REPORT of Mr. JAMES BLACK, on the Building of a STONE BRIDGE of Three Arches.

IN the Number of Resolutions passed by a Select Committee of the Honourable House of Commons, relative to this Object, One is found to the following Effect; viz. "That an Iron Bridge, "having its Centre Arch not less than 65 Feet high clear above High "Water Mark, will answer the intended Purposes with the greatest Con- "venience, and at the least Expence."

Your Reporter disclaims all Intention of considering the Merits, or of criticizing the Disadvantages of this Mode of Structure, generally, but in the present Case he cannot avoid observing that a Framework of Iron, or a Framework of Wood, can alone be considered as a Skeleton of a Bridge, which will be subject to considerable Vibrations. Vibrations are attendant on all Structures, and they are the primary Causes of their Decay and final Ruin. Wherefore Structures which are by their Form less subject to Vibrations are the most durable, of which the Pantheon is a striking Instance. But it may be proper to observe also, that when the Causes are complete, a Framework may be subject by its Form to instantaneous Ruin, of which we can have no Instance, from the recent Use of this Mode of Building. On the other Hand, solid Structures of Stone proceed by a gradual Decay the common Course of Nature. Thus, although a Framework may be endowed with its Beauties of Form, and be very compact in its Connections, it cannot be considered as having the Properties of Solidity and Durability of a Body well proportioned, and constructed of the best Materials. This reasoning induced your Reporter to form the Profile and Section which accompany this Report, submitted to your Consideration with perfect Deference to better Opinions.

DESCRIPTION of the PROFILE and SECTION.

PLATES XXII and XXIII.

	Feet Span.
The Bridge consists of Three Arches; viz. -	$\left\{ \begin{array}{l} 1 \text{ Centre Arch} = 230 \\ 2 \text{ Side Arches} = 440 \\ 2 \text{ Piers} - - = 80 \end{array} \right.$
The Height above High Water Line <i>ft. in.</i>	
to the Crown of the Arch - - - 65 -	= 750 Feet Span.
Of Granite Arching - - - 10 -	
Freeze - - - - - 6 -	
Gravel and Pavement - - - 3 -	
	78 6
From which if we deduct Height } of Land - - - - - }	7 -
	71 6
	at 2 Inches $\frac{1}{4}$ Yard, will make an inclined

inclined Plane of 1,287 Feet, or 429 Yards; viz. some Yards South of the present Sessions House in the Borough of Southwark.

On the London Side it would form an Appulse with the Land near the Top of St. Martin's Lane.

Your Reporter now proposes to keep to the Consideration of the Bridge alone, from Land to Land, and proceeds to observe on the Combination of the Centres.

On the COMBINATION of the CENTRES,

Reporter begs leave to refer the Honourable Committee to his printed Account of a proposed Mode of combining Timber by Dove Tail Treenails, 1797: While he observes that nothing has occurred to him since that Period to alter his Opinion, and that a material Advantage attends this Method, in consequence of the Timber, after having served this Purpose, being convertible to all other Uses, with a small Diminution of its Quantity.

The bearing Surfaces of the Chords and other Parts of the Centres may be estimated, viz.

Eleven Partitions, Six Rows, and Eight Butt Ends = 11,6,8 = 528.

And Perpendiculars,

6 Rows = 2 × 3 } = 432.

12 Partitions,

Architrave,

42 Breadth × 140 Length,

= 5,880.

= 6,770 superficial Feet, to support 85,000 Cube Feet Semy Arch of Granite, viz. between 12 and 13 Feet of Stone to bear on One Foot Timber. But this mechanical Estimate is on the Supposition, that the whole Semy Arch would bear at once on the Centres; which would not be the Case; because, by working One Third of the Arch from Pier to Pier, and then, by giving Ease to the Centres, to suffer the Stone to approach into close Contact, this Arch would for the Remainder of the Work support its own Superstructure, and the Centres would never have to bear above One Third of the Weight of the whole Arch; that is, about from Four to Six Feet of Stone on every Foot of bearing Timber, whereof about One Sixth would be perpendicular Pressure on Butt Ends, the Resistance of which is known to be very great. But if it be taken as an equal Pressure on all the Circumference of an Ellipsis, the Resistance would be greater.

On the MASONRY.

The Reporter is informed that the Strata of Granite are found in Aberdeenshire, and many other Parts, of a Thickness in the Bed from 6 to 15 Inches and more, even from 12 Inches to 4 Feet. It is proposed to have these Stones cut at the Quarries of only Two Dimensions; viz. of Two Feet broad and Four Feet long, and of Two Feet broad and Three Feet long, and the Thickness to be accurately marked at the Quarry on each

each Stone. By the Use of these Two Dimensions generally, and the natural Thickness of the Beds adapted to their several Stations, it is proposed to form the Piers and the Arches, as exhibited in the Section of Masonry, combined with Lime made of the Aberthaw Pebble and the best River Sand, which it is supposed would in a Course of Years combine into a solid Mass of Granite. By the accurate Analysis of Lime of the late Dr. Black, it seems the Course of Nature, that Lime will, by re-absorbing its fixed Air, regain the same Density it had in its State of Lime Stone; on this Supposition the Mortar of the Aberthaw Pebble and hard clean Sand, would in Time acquire that Degree of Endurance, which is observable in any of the Buildings of the Ancients, where Bricks and Mortar form a Mass of equal Density and Hardness.

ESTIMATE of the COST.

	Cubical Feet.	Cubical Feet.
The Middle Arch would contain of Granite	- 157,153	Of Portland Stone 13,110
The Two small Arches - - - of Ditto	- 267,818	- - - 12,540
The P I E R S.		
2 Middle Piers of Granite	- 461,020	
Less Openings - - -	- 44,958	
	- 416,062	- 17,588
2 Land Piers - - -	- 316,540	
Less Openings - - -	- 35,616	
	- 280,924	- 6,376
	Granite - 1,121,957	Portland - 49,614
11,121,957 Feet of Granite, set at 4/6 per Foot	- - -	- £. 252,440 -
49,614 Feet of Portland, set at 6/ per Foot	- - -	- 14,884 4.
	Granite and Portland	- £. 267,324 4
250,240 lbs. of Iron Chain Bars, at 4d.	- - -	- 2,504 -
10 Tons of Lead, at £. 20.	- - -	- 200 -
2 Caissons, containing 19,368 Feet Wrought Elm, at 3/6	- - -	- 3,329 8

CENTRES.

	£.	s.
Architrave and Entablement - 8,232 C. Feet Elm, at 3/6	- 1,440	12
Radii and Chords, Oak - - 3,228 - - Oak, at 5/6	- 887	14
194 Load Memel Timber, wrought - - -	- 1,357	11
	- 3,685	17
Half Arch - - -	- 3,685	17
Half Arch - - -	- 3,685	17
Cost of Centre of Great Arch - - -	- 7,371	14
One Centre of Small Arch - - -	- 7,000	-
	- 14,371	14
500 Feet Pile Planking, at 2/ per Foot - - -	- 500	-
Machinery, Ropes, &c. - - -	- 5,000	-
800 Yards Gravel and Pavement, at 7/6. + 12 = 19/6. per Yard, say 20/ - - -	- 800	-
	- £. 294,089	6
Charge for Management		

N. B. The Timber will be worth - - - £. 10,000 -

The Duty on 1,170,561 Feet of Stone, at 8d. 39,018 14

The Price of Memel Timber is risen from £. 2. 5s. to £. 5. 15s. per Load.

STABILITY.

There seem to be Two Points of View in considering the Stability of a Bridge, One is, that when the Superstructure is entirely supported by the Coupe of the Vouffoirs turning the Gravity to the Piers, in which Case the Pressure against the Key Stone is to be considered with relation to the Solidity of the Materials, and compared with the Weight that is supported by the Pier, with respect to its Proportion and Solidity.

The Second Case is, when by the Mode of Structure and Cohesion of the Materials, the Pier may be considered as supporting Two Brachia, the Common Centre of Gravity passing within the Pier, whereby the Key is little more than the Point of Contact between the Two extended Brachia. This is the Construction which is intended to apply to the Plan proposed of a Bridge to be constructed of Granite, cemented by the Aberthaw Lime and the best River Sand.

Although this Mode of Calculation does not strictly apply until the Mortar has acquired by Time its proper Endurance, yet with respect to the Stability for a Length of Time, it is the surest Cause to produce the Effect, by preventing those strong Vibrations, and their Effects, which terminate the Duration of all Structures.

$$\begin{array}{rcl}
 \text{The Middle Arch's Weight} & - & 157,153 \\
 \text{The Half Arch} & - & 78,576 \\
 \text{The Side Arch } \frac{1}{2} & \frac{133,909}{66,954} &
 \end{array}$$



$$\text{And } \frac{78,576}{66,954} \text{ reduced, will be about } 9 \text{ to } 7\frac{1}{2}.$$

so that the Centre Line of the Whole will be upon the Pier about 1/11 on the Side of the Great Arch. But by the Construction, this Difference will be compensated by the greater Solidity of the Pier on the Side of the little Arch, which will bring the Centre of Gravity very near to the Centre of the Pier. So that when the Endurance of the Mortar is complete, the Pier might stand with its extended Brachia unconnected with the adjoining Arches, and would ensure the greatest possible Degree of Stability.

The Solidity of the Piers will be 720,950 to the Arches 450,621 or nearly as 72 : 45.

Finally if we consider the Stability of the proposed Plan, excluding out of the Account all Cohesion by Cement of the Materials, it will be found that

that the Angle of the Chord from the Couffinet to the Key is 62° and divided by the Radius into 75 : 25 for the Proportions of the Materials on the Side of the Pier and the Key, which will be $\frac{170,000}{2}$ Weight of Semy

$$\text{Arch} = 28,333 \times \frac{34}{2} \text{ Pressure}$$

$$\text{At } 62, \text{ Angle} = \frac{19,266}{14} = 1,360 \text{ Tons Pressure at C.}$$

Deducted from 85,000 Feet Semy Arch,

$$\frac{14}{14} = 6,071 \text{ Tons} = 4,711 \text{ Pressure at B.}$$

And the Surface at C. to resist the Pressure of 1,360 Tons, is $10 \times 42 = 420$ besides the Parapet, &c.

$1,360/3$. about 3 Ton to every Foot of Surface of Granite, which would not affect it. And this, on a Supposition which cannot take place, viz. an Absence of all Cement; but quite the contrary would be the Fact, viz. That by a proper Use of the Aberthaw Lime and good Mortar, the Pressure at the Key may be reduced to a Contact of Adhesion, by Contiguity of Parts, which will render the Stability sufficient to ensure Solidity and Durability equal to that of the best Structures.

The Land Arches would probably accommodate the Borough Market; but this is beyond the Subject, which is limited to the Consideration, Whether a Bridge of Granite may not be built on Principles of Convenience and Solidity, and ultimate real Economy?

Most humbly and respectfully submitted by

Your very humble Servant,

James Black.

Bennet Street,
Blackfriars Road.

Appendix (I.)

PLAN and ESTIMATE for a Bridge, as proposed by Messrs. TELFORD and DOUGLASS, consisting of a single Arch of Cast Iron, 600 Feet in the Span.

THE Plan which is here submitted by Messrs. Telford and Douglass, is calculated for the Situation shewn upon their general Plan, from near to St. Saviour's Church, a little to the West of Old Swan Stairs, and for the Height recommended by the Select Committee.

It comprehends the Bridge, and Abutments at each End; these Abutments answer also for the direct Communications, and the Inclined Planes. All the other Parts of the general Plan, say, the Inclined Planes, the Wharfs, and Avenues, are supposed to remain precisely as in the former Statements.

The Span of the Arch is made to suit the Width to which the River, as stated by Mr. Jessop, should be contracted, if it is excavated so as to have a Depth of 13 Feet at Low Water. That is, 600 Feet in the clear between the Abutments. The Rise is, as fixed by the Committee, 65 Feet above High Water Mark.

The Width of the Bridge at the Middle is 45 Feet, increasing gradually towards each Abutment to 90 Feet. This is calculated to embrace a greater Space on each Shore as a Foundation, to give greater Stability to the Structure of the Bridge, to afford more Room on the Roadway near each End, where the Throng generally is, and to connect better with the Inclined Planes, than the Bridges which are formed parallel in the Roadway.

The Whole of the Bridge is meant to be made of Cast Iron, with only Two Forms of Joints, which shall effectually connect all the Work, and yet admit of Parts being replaced in case of Accident, without endangering the Structure.

The Principle of the Iron Work is shewn in a Model, and by Drawings on a large Scale.

This Plan of One Arch possesses the Advantage of springing low, and yet leaving the most valuable Space in the River clear for the Passage of Ships, whereas in the Case of more Arches than One, they must be made to spring from high Piers founded in deep Water, upon Piles, and at the same Time they will occupy the most useful Part of the River. The Abutments can be formed of any Strength or Magnitude, by being judiciously connected with the Wharfs, Inclined Planes, &c.

The

The Facility of Execution will be much greater than where Piers are to be formed in deep Water.

The constructing with Cast Iron only, provides for an equable Expansion and Contraction of the Metal, and avoids the Objection which is justly made to the Risk of the hasty Decomposition or speedy Decay of Wrought Iron.

The Simplicity and Magnificence of One Arch is considered to be much beyond that of Five or Three Arches.

Besides accomplishing more perfectly the Objects recommended by the Select Committee, it is presumed that a Bridge executed upon this Plan, might be rendered an Instance of British Skill, and an Ornament to the Metropolis of the British Empire.

The following is an Estimate of the Expence of the Bridge, and the Abutments.

ESTIMATE of the Expence of a Bridge of Cast Iron, 600 Feet in the Span, including the Abutments.

Getting out and securing the Foundation for the Two	£.
Abutments - - - - -	20,000
432,000 Cubic Feet of Granite, or other hard durable	
Stone - - - - - at 4 s.	86,400
20,029 Cubic Yards of Brickwork - - - at 20	20,029
19,200 Cubic Feet of Timber in Ties, &c. - at 3/6	3,360
6,500 Tons of Cast Iron in Plates to Abutments, Ribs, and	
Ties to Arch, the covering Plates, the Side Plates	
to Roadway, and the Railing, and including	
fitting, putting up, and scaffolding - at £. 20	130,000
Making the Roadway and Footpath - - -	2,500
	£. 262,289

(Signed)

Thos Telford,
Jas Douglass.

The Facility of Extension will be much greater than where Piers are to be formed in deep Water.

The confining with Calhoun only provides for an equable expansion and contraction of the Metal, and avoids the Objection which is usually made to the Risk of the daily Decomposition. It is a very simple and easy method, and is the only one which is not attended with any of the inconveniences of the other methods.

The Simplicity and Magnificence of One Arch is compared to be much
and that of Five or Three Arches.

in the Span, including the Abdomen,

100.000	at 1.00	100.000	Getting out and securing the Foundation for the Two
2.500	at 1.00	2.500	Adjustments
			2.500 Cubic Feet of Granite on other land suitable
			Stone
20.000	at 1.00	20.000	20.000 Cubic Yards of Brickwork
3.500	at 1.00	3.500	3.500 Cubic Feet of Timber in Ties, Sec
			2.500 Tons of Coal for use in Piers to Adjustments, Piers, and
			Ties to Ash, the covering Piers, and 2.500 Piers
			to Railway, and the Railway, and including
			building, putting up, and scaffolding
			Making the Highway and T. 1.000



(Signed)
J. D. Doughty

